

Kids' pages

Are you ready to learn about the bay?

News for the kids
of Tampa Bay!

Fall 2018



Got a Question? Ask a Scientist!

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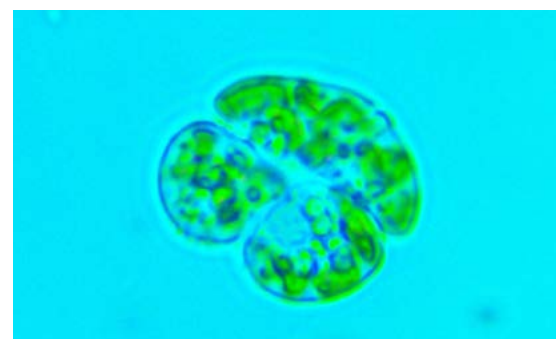
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Q What is Red Tide?

A Great question! There are many organisms around the world that can cause red tide, named for the

reddish color they can turn water. In Florida, the culprit is the phytoplankton named *Karenia brevis* (*K. brevis*), and they are a type of **phytoplankton** that occurs naturally in the Gulf of Mexico. Phytoplankton are microscopic, plant-like organisms that drift in our oceans. *Karenia brevis* is a special kind of phytoplankton called a **dinoflagellate**. They have a top and bottom half with a groove in the middle. They also usually have two flagella—a tail-like structure which allows them to move!

Red tide occurs when there is a **bloom** of algae. A bloom occurs when the conditions are just right for a plant or animal to multiply in an area in large numbers! It is when they are found in these high numbers that the waters can turn the red or brown shade associated with red tide, though the water can also stay its normal color during a bloom. *K. brevis* is a famous dinoflagellate not just because of its color, but because it can have a negative effect on both humans and animals alike!



Karenia brevis
Source: Audrey Mitchell, Tampa Bay Watch, Inc.

When *K. brevis* is found in large numbers, it is considered a harmful algae bloom, or "HAB." A HAB is any algae bloom that can produce toxins or have harmful effects on life. *K. brevis* naturally produces a toxin called **brevetoxin**. Depending on how large the bloom, the impact of this toxin can cause fish, marine mammals, sea turtles, and sea birds to die. It can also contaminate shellfish and cause respiratory discomfort in humans who can experience runny noses, coughing, or scratchy throats. 🦋

Sources: coastalscience.noaa.gov; earthobservatory.nasa.gov; mote.org; myfwc.com; nationalgeographic.com; noaa.gov; sciencedirect.com; sms.si.edu; ucl.ac.uk

Pierce, R. H., and M. S. Henry. "Harmful Algal Toxins of the Florida Red Tide (*Karenia brevis*): Natural Chemical Stressors in South Florida Coastal Ecosystems." *Ecotoxicology* (London, England) 17.7 (2008): 623–631. PMC. Web. 22 Aug. 2018.

Quilliam, MA. 2003. Chemical methods for lipophilic shellfish toxins. 211–245. In: Hallegraeff, GM et al. (Eds.) *Manual on Harmful Marine Microalgae*. UNESCO Publishing, Paris.

Steidinger et al. 1998; Kusek et al. 1999; Lekan & Tomas 2008; Vargo 2009.



Mark your Calendars!

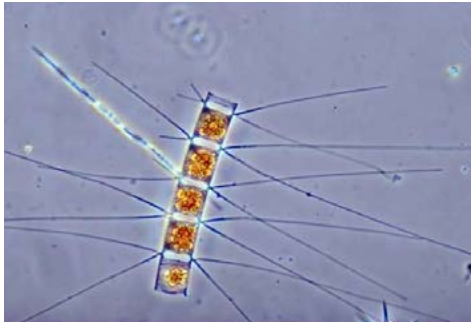
PUMPKINS ON THE PORCH

OCTOBER 29, 2018

Pumpkins on the Porch is a free family-oriented event which offers festive games, pumpkin painting, and a Halloween parade. After the activities, everyone gathers together on the lawn to watch "It's the Great Pumpkin, Charlie Brown" and enjoy a beautiful sunset on Tampa Bay.

Expand Your Mind!

Meet & Greet Our Photosynthetic Friends

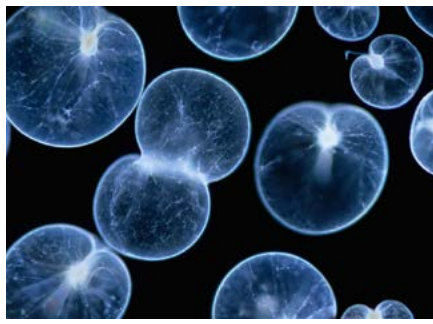


CHAETOCEROS SPP.

Chaetoceros spp. is a type of phytoplankton called a diatom. Diatoms are one of the two main types of phytoplankton. They can be recognized by their cell walls or “houses” that are made of a glass-like substance called **silica**. Their glass-like structure can make them quite beautiful!

Chaetoceros is a species that can form in long chains and have large thick spines. *Chaetoceros* is one of the largest groups of diatoms, with around 400 different species!

Sources: diatoms.org; Kraberg, A., Baumann, M. and Durselen, C. D. 2010. *Coastal Phytoplankton: Photo Guide for Northern European Seas*. Verlag Dr. Friedrich Pfeil, Munchen, Germany. 204. oceandatacenter.ucsc.edu; biomarks.eu

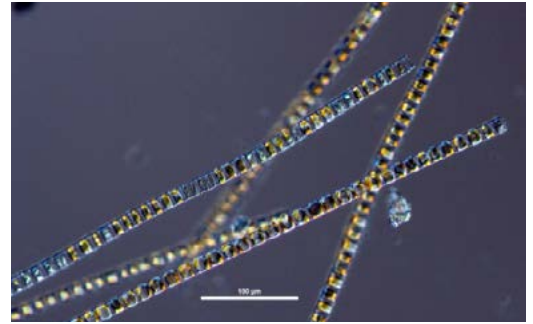


NOCTILUCA SP.

Noctiluca is a type of dinoflagellate. This phytoplankton is special because it can bioluminesce! Bioluminescence is light created by a living plant or animal that makes it “glow!”

Noctiluca can produce a bluish light when they are disturbed or moved around. It is thought that they do this as a defense behavior. They are usually seen by humans when they walk through the water at night. The *Noctiluca* can create a glittering effect, which is why they are often called “sea sparkle.”

Sources: amnh.org; botany.si.edu; edition. cnn.com



SKELETONEMA SPP.

Skeletonema spp. gets its name because it looks like a backbone or spine—part of your skeleton! This long, slender diatom is actually a chain of individuals; kind of like a ladder. Linking up into chains allows phytoplankton to share energy!

Skeletonema is a common phytoplankton in the Tampa Bay area.

Sources: noaa.gov; oceandatacenter.ucsc.edu; eoas.ubc.ca



Our education programs get kids into the bay!

Can We Stop Red Tide?

CONSERVATION
CORNER

A question commonly asked is, "How can we help or stop red tide?"

Harmful algae blooms like red tide are influenced by many different things. There is not necessarily one way to stop or prevent a *Karenia brevis* bloom.

Studies have shown that there are around 12 documented sources of nutrients in South Florida waters that can have an effect on blooms. Some of the offenders include decaying plants or animals, animal waste, underwater sediments, nitrogen sources, amount of light, and other causes.

The formation of the blooms are a naturally occurring event. The events in the Gulf of Mexico



have been documented as far back as the 1700s! When a *K. brevis* bloom forms, it starts about 10-40 miles off the coastline. The bloom can be pushed inshore by wind and currents.

Once *K. brevis* reaches the coastline, human-produced nutrient sources can promote its growth. Controlling red tide is not a simple task, but humans can help by reducing their nutrient inputs—water pollution, wastewater, or runoff from land and farming, for example. Presently, there is not a practical way to control red tide blooms. Ongoing research and monitoring are important for humans to understand how these harmful algae blooms work so we can help reduce the negative impact.

Sources: mote.org; myfwc.com; nationalgeographic.com; oceanservice.noaa.gov; Les Neuhaus, Tampabay.com

Fun Facts about Phytoplankton!

- *Karenia brevis* was named after local St. Petersburg renowned research scientist **Karen Steidinger**!
- It is estimated that about **70% of the oxygen we breathe** comes from marine algae and plants!
- The word **phytoplankton** comes from the Greek words **phyto** (plant) and **planktos** (drifter).

Sources: nationalgeographic.org; dw.com; mote.org; baysoundings.com

Did You Know...

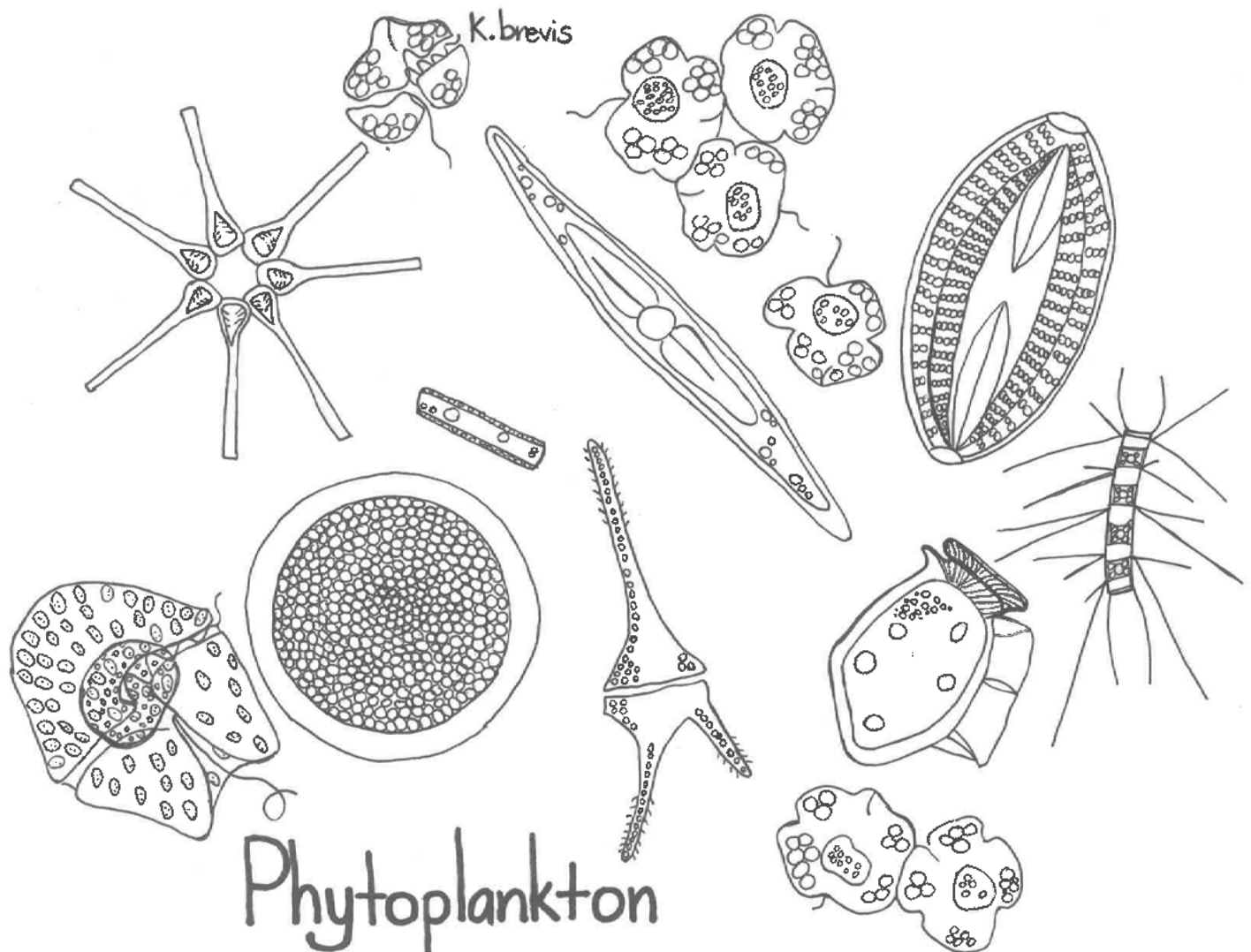
Phytoplankton are at the bottom of the marine food web. They are a food source for everything in our oceans—from microscopic animal-like zooplankton to gigantic whales! Source: earthobservatory.nasa.gov.



Fun Activity:

Phytoplankton Coloring Page

Instructions: Print this fun phytoplankton coloring page, color, and enjoy!



Source: Audrey Mitchell, Tampa Bay Watch, Inc.

Find the link to download the coloring page at tampabaywatch.org/kids--pages

Kids' pages Investigations

Topic: Red Tide



Fall 2018 edition

Instructions: Read through the appropriate Kids' Pages edition and answer the questions below. Once all the questions have been completed, refer to the Answer Key to check your work.

Multiple Choice (choose one):

- What type of plankton is the red tide-producing *Karenia brevis*?
 - Phytoplankton
 - Zooplankton
 - Holoplankton
 - Meroplankton
- Which statement is not true of a red tide bloom?
 - Conditions are perfect for the organism to multiply.
 - The waters containing red tide do not necessarily change color.
 - It can contaminate shellfish.
 - It occurs when *K. brevis* numbers are low.
- What does HAB stand for?
 - Hurtful Algae on the Beach
 - Hazardous Algae Bloom
 - Harmful Algae Bloom
 - Harmful And Bad
- Which of the following phytoplankton is known to bioluminesce, or produce light?
 - Noctiluca
 - Chaetoceros
 - Karenia brevis*
 - Skeletonema
- In the word "phytoplankton," what does the root word "*phyto*-" mean?
 - Light
 - Plant
 - Sun
 - Drifter

Fill in the Blank:

- Phytoplankton are microscopic, _____ organisms that drift in our oceans.
- K. brevis* is a special type of phytoplankton called a _____, with a top half, bottom half, and a groove in the middle.
- K. brevis* naturally produces a toxin called _____, which can cause animal fatalities and respiratory discomfort in humans.
- It's estimated that marine algae and marine plants are responsible for _____ percent of the oxygen we breathe.

Short Response:

- Using your wildest imagination, create a fictional plan for controlling red tide. In the description of your fictional management plan, include at least two features that would help reduce human-produced nutrient inputs, using the Conservation Corner of the Kids' Pages Publication.

Kids'pages Investigations

Topic: Red Tide



Fall 2018 edition

ANSWER KEY

1. A. It is a type of plant plankton.
2. D. In fact, blooms occur when there are high numbers of *K. brevis* in the water.
3. C. Scientists monitor for HABs in order to alert beachgoers when they should avoid the beach.
4. A. It produces a bluish light when agitated in the water.
5. B. "Phyto-" is Greek for plant.
6. Phytoplankton are microscopic, plant-like organisms that drift in our oceans.
7. *K. brevis* is a special type of phytoplankton called a dinoflagellate, with a top half, bottom half, and a groove in the middle.
8. *K. brevis* naturally produces a toxin called brevetoxin, which can cause animal fatalities and respiratory discomfort in humans.
9. It's estimated that marine algae and marine plants are responsible for 70 percent of the oxygen we breathe!
10. Answers will vary. *Example answer: Solar-powered beach robots comb the beaches during red tide events, scooping up fish that have washed ashore to avoid unpleasant smells. Sensors on buoys floating 40 miles offshore signal to FWC when red tide blooms are present and moving towards the shore so that scientists can release red tide-eating robots to remove the red tide phytoplankton from the water. Irrigation systems are implemented on farms to redirect farm runoff to reservoirs to be treated and used to water park grass, lawns, and sections of forests.*