HELLO!

The good folks at Solutions To Avoid Red Tide (START) are glad that you are interested in learning more about Florida red tide. START is a volunteer organization that helps people learn more about red tides in Florida. We hope you have fun with this book and that you learn something along the way!

If you want to learn more about Florida red tides, ask your mom or dad or guardian for permission and help to visit our website, www.start1.com. There is a kid’s page labeled ‘Be START Smart’ (just like this book) with lots of fun activities and games. The website even has stuff for adults! You can also ask to go to see one of START’s red tide displays at South Florida Museum, the Pier Aquarium, ‘Ding’ Darling National Wildlife Refuge, Mote Aquarium, or at Rookery Bay National Estuarine Research Reserve.

Have fun wearing your new ‘Be START Smart’ tattoos. People, like your brothers, sisters, friends, and neighbors, may ask you what you are wearing. You can tell them everything you learned about Florida red tide!

Later taters,
Mr. K. brev
Hey there!

My name is Karenia brevis, but you can call me K. brev for short!

I am a microscopic algae that lives in the Gulf of Mexico. An algae is a cross between a plant and an animal. I have these special organs, called chloroplasts, which let me turn sunlight into food.

Pretty cool, huh?!

All living things need energy to live. Photosynthesis is the process that converts energy in sunlight to usable forms of energy. This energy from the sun is absorbed by green pigments called chlorophyll found in the organelle chloroplasts. This is where photosynthesis happens.

The nucleus holds all of our chromosomes... genetic (genes) information that help to make up what we are.

This one helps to propel (move) through the water.

This one helps to steer and give direction, like the rudder does on a boat.

Scientists have categorized us as a dinoflagellate because we have 2 flagella.
**Pulled Apart**

I am made up of many parts. Write the name of each part and draw my parts on me so that I am complete.
Friends & Family

My friends and family live all over the United States. I live in the area marked by the stars. To the right are three members of my family. Alex lives off the coast of Maine (△). Nitzchi lives off the west coast of the U.S. (○) and Micro lives in lakes in Michigan (□). Like your friends and family, my family travels around to different places too! Can you draw a line from their photographs to the places where they live?

To learn more about the different members of the Harmful Algal Bloom family, visit www.whoi.edu/redtide.

Microcystis spp
Alexandrium spp
Pseudo-nitzchia spp
Growing up...

You know how you make marks on a wall to measure how much you’ve grown? Well, I grow too, but in a different kind of way. Your body is made up of hundreds of thousands of cells, but my body has only one cell. So, every few days, my one cell divides into two. Draw in the number of cells for each day. So, how many cells do I become after 3 days? What about after 4 days? What comes next?

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Day 1 Image" /></td>
<td><img src="image2.png" alt="Day 2 Image" /></td>
<td><img src="image3.png" alt="Day 3 Image" /></td>
<td><img src="image4.png" alt="Day 4 Image" /></td>
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</table>
T.R.O.U.B.L.E.

When there are a lot of my cells all together in the same place it is called a bloom. A red tide bloom to be exact. See, in small amounts, I am not such a bad guy. But when a bunch of us get together, it can spell out T-R-O-U-B-L-E. A red tide bloom goes through stages. Why do you think this is TROUBLE?

The reason that so many of us together is a problem is because each of my cells produces a toxin called brevetoxin. This toxin makes lots of animals that live near the water or in the water sick. I know it’s terrible, but I can’t help it. It’s a fact of nature!
A-maze-ing!

People can get sick too, if they breathe the toxins from the air. So do turtles, birds and manatees. Help the red tide bloom move away from the people and animals at the beach!
Flag talk

Most red tide blooms begin in September or October, but it’s important to be safe at the beach all year round. The lifeguards at the beach help us stay safe by flying different color flags.

- A green flag means good swimming conditions. Will you color this flag green?
- A yellow flag means use caution when swimming. Make this flag a yellow one!
- A double red flag means the beach is closed for swimming. Please color both flags red!
- A purple flag means that hazardous marine life is present. Sometimes lifeguards use this flag to show that a red tide bloom is in the area. Ugh oh, make this one a purple flag.
- A red flag means that swimming is dangerous. Can you find your red crayon?
My Beautiful Day...

What are your favorite things to do at the beach? Draw a picture or write a story about your perfect day at the beach!

To find out what color beach flag is flying at your favorite beach, check out the Beach Report at:

www.mote.org/beaches

Each beach is updated twice a day!
Protect yourself!

Be careful of the seafood you eat. Commercial seafood found in restaurants and grocery stores is safe because it comes from red tide free water and is monitored by the government.

Recreational fisherman must be careful not to take mollusks (clams or oysters, sometimes called shellfish) from Florida red tide waters since they contain toxins that cause food poisoning. The edible parts of crustaceans, also called shellfish (crabs, shrimp and lobsters) are not affected by red tide and can be eaten as well as finfish if they are caught live and filleted.

Put a smile 😊 next to the food that is safe to eat and a frown 😞 next to those that can be dangerous.

1. _____ shrimp
2. _____ clams
3. _____ stone crab
4. _____ commercial shellfish
5. _____ seafood dinner in restaurants
6. _____ lobster
7. _____ oysters
8. _____ tuna (a finfish)
9. _____ crab
10. _____ seafood from the grocery store
11. _____ crustaceans
12. _____ mollusks

Hot Line Number:

1-888-232-8635
Skin and Inhalation

People with respiratory problems should avoid red tide areas, especially when winds are blowing toxins near shore. Most people can swim in red tide but it can cause skin irritation and burning eyes.

If you have asthma and go to the beach, check the marine forecast and take your fast acting inhaler with you. Remember to take your medications as prescribed by your doctor and let your parents know if you feel like you are getting a cold (early sign of asthma flare), have a constant cough, or your asthma is getting worse. If you have any symptoms, leave the beach and seek air conditioning.

Match the sentences by drawing a line from the left column to the right column for more health tip information.

A. If your skin is easily irritated...
B. Get out and thoroughly wash off with fresh water...
C. Swimming near dead fish...
D. Symptoms from breathing red tide toxins are normally...
E. Symptoms are usually temporary when...
F. Wearing a particle filter mask may...
G. Fewer toxins are in the air when...

1. lessen the effects and research shows that using over-the-counter antihistamines may decrease your symptoms.
2. the wind is blowing offshore.
3. red tide toxins are in the air.
4. if you experience irritation.
5. is not recommended.
6. avoid Red Tide water.
7. coughing, sneezing and teary eyes.
**Pet Protection**

Draw the dangers to your pet when at the beach.

- If your dog swims in a red tide patch, rinse him/her off since most dogs lick themselves and will consume any toxin /organisms left on the fur.

- Don't let your dog play in sea foam (10X more toxic than water).

- If your dog has asthma avoid days when there is a lot of toxin in the air. How do you know? If people on the beach cough, they are inhaling toxin too. Be especially vigilant about your pet's daily medication during red tide.

- Do not let your dog or cat eat or play with the dead fish.

- If your animal is behaving oddly with confusion, loss of balance, unsteady gait, seek veterinary care.

Find the phone number of the closest emergency vet. Write it in the space below.

____________________________

Closest emergency vet number
Word to the wise

Help K. brev find these hidden words:

ALGAE
BEACH
BLOOM
BREVIS
CHLOROPLAST
DINOFLAGELLATE
FLORIDA
GULF
HEALTH
HOTLINE
KARENIA
MANATEE
MEXICO
MICROSCOPE
NUCLEUS
RED
RESEARCH
SEA
SHELLFISH
TIDE
TURTLE
Who’s sick?
Meet some of my friends who sometimes get sick from breathing in red tide. Can you guess who they are? Connect the dots to find out!
Scramble it up!

Create as many words as you can from the letters in Karenia brevis.

example: bear

__________________

__________________

__________________

__________________

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__________________

__________________

__________________
Across
7. Having two flagella
10. Organelle where photosynthesis happens
14. The green pigment that absorbs the energy from the sun
15. First half of my name, or my genus name

Down
1. Large group of K. brevis organisms
2. Where K. brevis is found: _______ of Mexico
3. My family member that lives on the West Coast of the U.S.
4. Pets should not eat the ______ because it is 10X more toxic than the water
5. What oysters, clams, crab and shrimp are
6. Red tide blooms affect animals and ______
8. Lifeguards use this flag to show that a red tide bloom is in the area
9. Holds chromosomes that help make up what we are
11. 1-888-232-8635
12. Cross between a plant and an animal
13. Flag that means good swimming conditions
Tell the Truth, now...

Put a “T” or an “F” next to each statement to show which are true and which are false.

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<tbody>
<tr>
<td>1.</td>
<td>__</td>
<td>Red tide can make you cough.</td>
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<td>2.</td>
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<td>An algae is a cross between an animal and a plant.</td>
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<td>3.</td>
<td>__</td>
<td>K. brevis cell will divide into 8 cells after 3 days.</td>
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<td>4.</td>
<td>__</td>
<td>Red tide turns the water a rusty brown color.</td>
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<td>5.</td>
<td>__</td>
<td>Red tide can make the fish turn red.</td>
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<td>6.</td>
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<td>Red tide can kill fish.</td>
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<td>7.</td>
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<td>Red tide blooms are made up of hundreds of cells.</td>
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<td>8.</td>
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<td>One of the stages of a red tide bloom is stationary.</td>
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<td>9.</td>
<td>__</td>
<td>The lifeguards at the beach fly a red flag when there is a red tide bloom.</td>
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<td>10.</td>
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<td>Seafood at a restaurant is safe to eat even during a red tide bloom.</td>
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<td>11.</td>
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<td>If you have symptoms at the beach during a red tide bloom, it is best to stay out of air conditioning.</td>
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<td>12.</td>
<td>__</td>
<td>Red tide sea foam can make your dog sick if he plays in it.</td>
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Dressed for Success

Design your own T-shirt with an environmental message. At the bottom of page, K. brev demonstrates his tee shirt design.

Here's my tee... let's see yours!
Memory Check

Use what you have learned so far to finish these sentences!

1. A lot of red tide cells together in one place is called a ______________.

2. Red tide cells use ______________ to create food from sunlight.

3. K. brev’s ______________ helps him swim through the water.

4. Karenia brevis is a ______________ grower.

5. Red tide blooms affect __________ mammals and fish.

6. A __________ beach flag means that water conditions are perfect for swimming!

7. Call the red tide _______________ if someone you know gets sick from red tide!

8. Don’t let your dog eat _________ _________ on the beach.

9. Oysters and clams are types of ______________.

10. People with ______________ should avoid high aerosol days.

Hints:

- Hotline
- Asthma
- Both
- Photosynthesis
- Dead Fish
- Flagella
- Shellfish
- Green
- Slow
- Bloom
How do we feel?

So, now you have learned all about how Florida red tide affects people, animals, and the environment. How do you think these people or animals feel during a red tide bloom? How does Florida red tide affect them individually?
Check your Answers

Page 9:
1. ☑
2. ☑
3. ☑
4. ☑
5. ☑
6. ☑
7. ☑
8. ☑
9. ☑
10. ☑
11. ☑
12. ☑

Page 10:
A. 6
B. 4
C. 5
D. 7
E. 3
F. 1
G. 2

Page 12:

Page 15:

Page 16:
1. T
2. T
3. T
4. T
5. F
6. T
7. T
8. T
9. F
10. T
11. F
12. T

Page 18:
1. Bloom
2. Photosynthesis
3. Flagella
4. Slow
5. Both
6. Green
7. Hot Line
8. Dead Fish
9. Shellfish
10. Asthma
Check out the Web

For more information on Florida red tide, check out these websites (with permission, please):

START - http://www.start1.com
Florida Fish and Wildlife Research Institute - http://research.myfwc.com
Florida Department of Health - http://www.doh.state.fl.us
Mote Marine Laboratory - http://www.mote.org
Woods Hole Oceanographic Institute - http://www.whoi.edu/redtide

To find out if a bloom of Florida red tide is happening, ask for permission to visit these websites:

Florida Fish and Wildlife Research Institute - http://research.myfwc.com
and click on ‘Red Tide Current Status Statewide Information’

Mote Marine Laboratory - www.mote.org/beaches
And click on your favorite beach!!
This activity kit is...

Brought to you by:
Solutions To Avoid Red Tide, Inc. (START)

Developed by:
Englewood START, Ashley Huffman, Carolyn Trohoski, and Leigh Zimmermann

Designed by:
designWorks advertising associates

A special thank you to
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Be START SMART

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