

Phil the Phytoplankton

by

Kylie Kihm & Lexi Frankiewicz

World Languages & Cultures Department

College of Liberal Arts

California Polytechnic State University

San Luis Obispo

June, 2020

Copyright © 2020
Kylie Kihm & Lexi Frankiewicz
All Rights Reserved

APPROVAL PAGE

TITLE: Phil the Phytoplankton

AUTHOR: Kylie Kihm & Lexi Frankiewicz

DATE SUBMITTED: June 2020

Dr. John Thompson

Senior Project Advisor

Signature

World Languages & Cultures Department
College of Liberal Arts

California Polytechnic State University
San Luis Obispo

June, 2020

Dr. John Thompson

Senior Project Advisor

Signature

Dr. John Thompson

WLC Outcomes Committee Chair

Signature

Dr. Fernando Sanchez

Department Chair

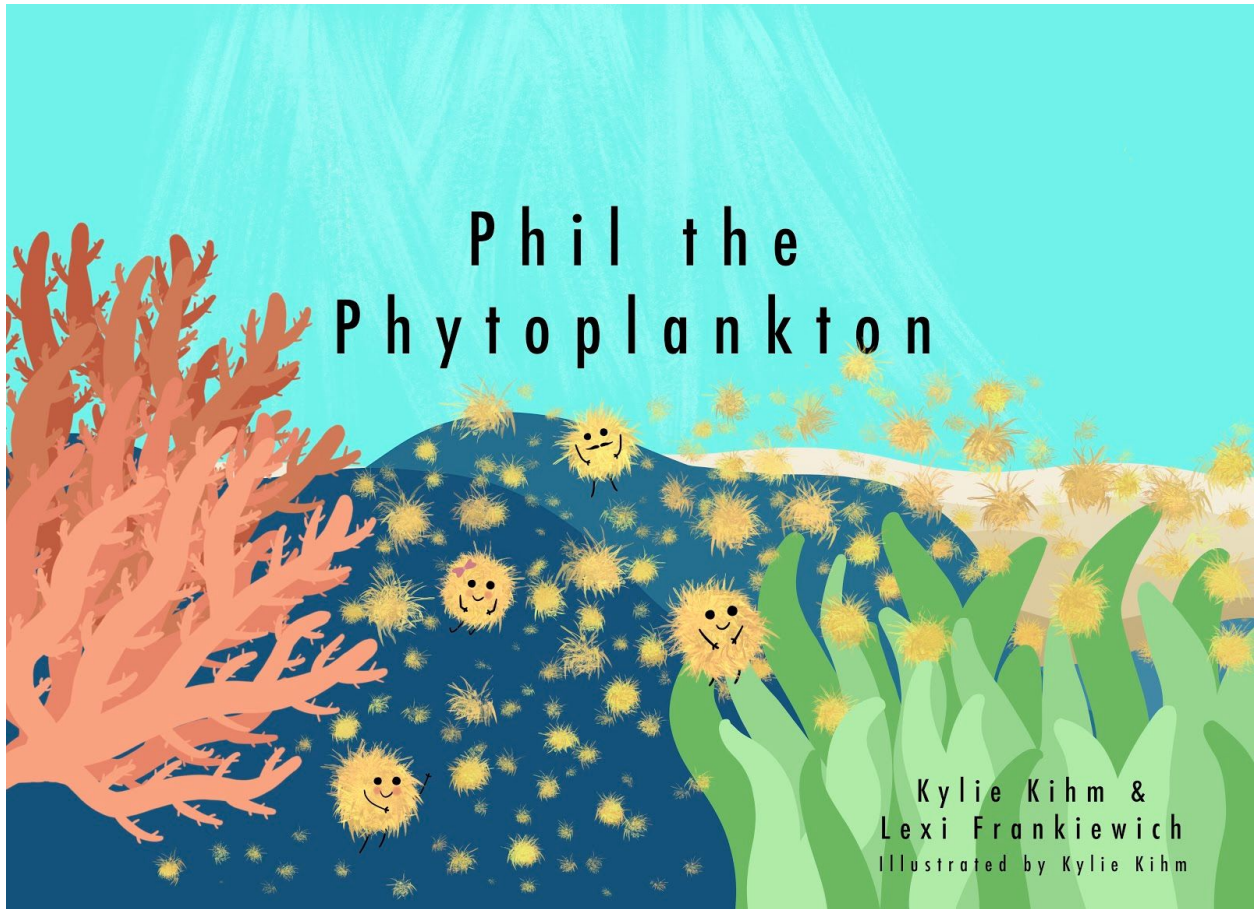
Signature

Table of Contents

Abstract.....	6
Book Cover (English).....	7
Dedication (English)	8
Content of Children's Book (English).....	9
How to Help! (English)	22
Comprehension Activity (English).....	23
Word Search Activity(English).....	24
Vocabulary (English).....	25
Activity Answers (English).....	26
Book Cover (Spanish).....	28
Dedication (Spanish)	29
Content of Children's Book (Spanish).....	30
How to Help! (Spanish)	43
Comprehension Activity (Spanish).....	44
Word Search Activity (Spanish).....	45
Vocabulary(Spanish).....	46
Activity Answers (Spanish).....	47
References.....	49

Abstract

This project, a bilingual children's book, "Phil the Phytoplankton" and "Felipe el fitoplancton" educates young readers on the importance of phytoplankton in our world. The book emphasizes the fact that such small organisms, invisible to the naked eye unless gathered in immense quantities, are responsible for providing the earth with approximately 50% of the oxygen essential for human life. As defined by Cal Poly, sustainability is "the ability of the natural and social systems to survive and thrive together to meet current and future needs." This book encourages a symbiotic relationship as a young girl, initially afraid of the unknown, learns to care about the oxygen-giving life in the ocean waters just outside her home. The book concludes by providing the reader with tangible actions to support the natural living systems in an everyday setting. The comprehension questions and word search that follow the story provide an interactive element, which allows for young minds to retain the information in a child-friendly manner. The digital illustrations are designed to give the greatest sensorial impact to the narrative and assessment portions of the book and demonstrate technical and artistic expertise acquired at Cal Poly. With the content available in both English and Spanish, important scientific concepts are able to be accessed by a more widespread and inclusive audience. Within our own discipline, specific translation and linguistic techniques and concepts have been applied in elaborating this project, specifically regarding word choice and spoken language patterns. In addition, concepts from Spanish journalism coursework regarding target audience and outcomes have been applied. Finally, pedagogical training acquired via education coursework has informed the method of adapting complex terms to be better received by younger audiences. The process of elaborating both versions of the book has shed light on ways in which literacy is initially acquired and the importance of celebrating bilingualism. All of these aspects have come together to create a unique and intentional children's book for a diverse audience, helping our university community advance towards its goal to "Analyze and explain local, national, and global sustainability using a multidisciplinary approach" (Cal Poly Sustainability Learning Objective).



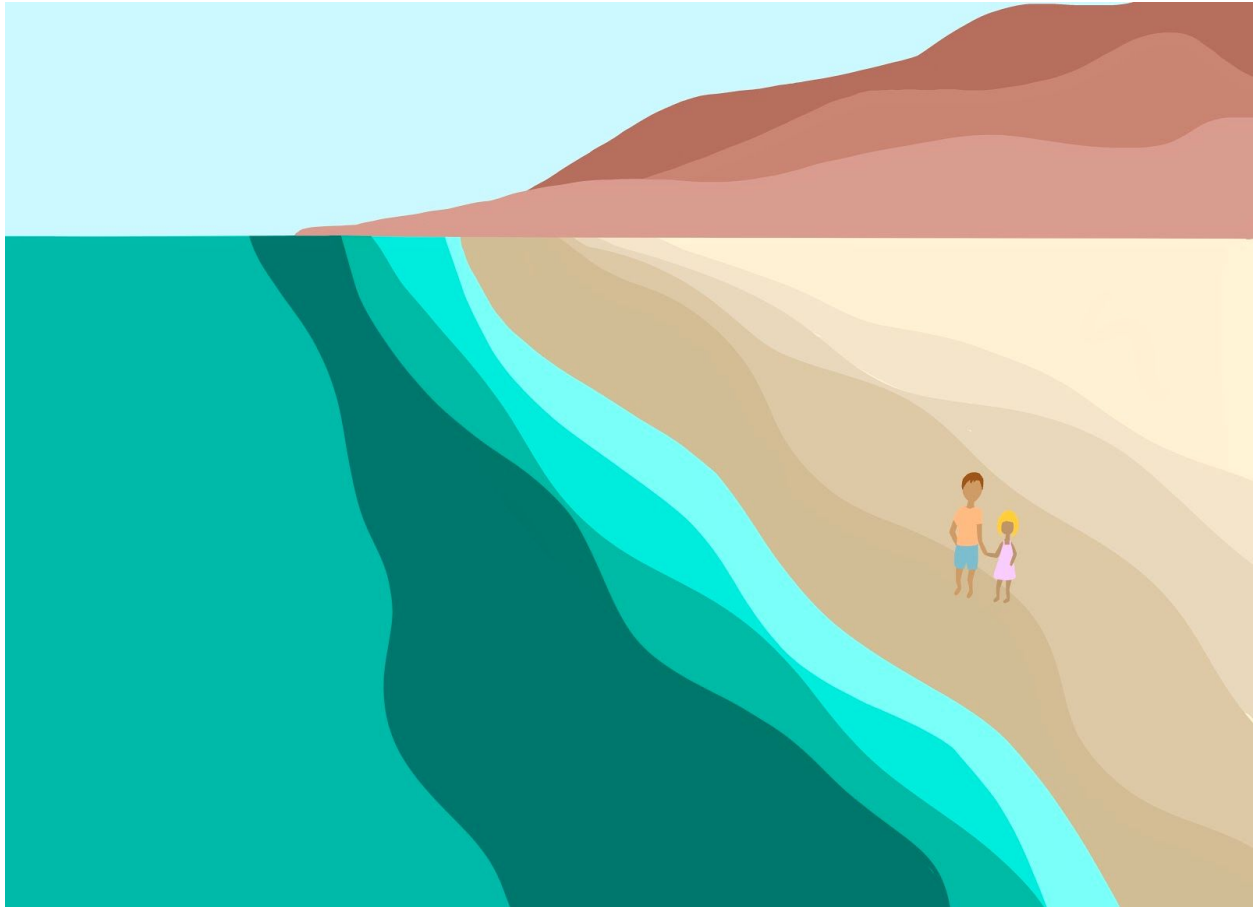
This book is dedicated to all of the professors of the Modern Languages and Literatures Department at Cal Poly, San Luis Obispo, who imparted on us a contagious passion for learning.



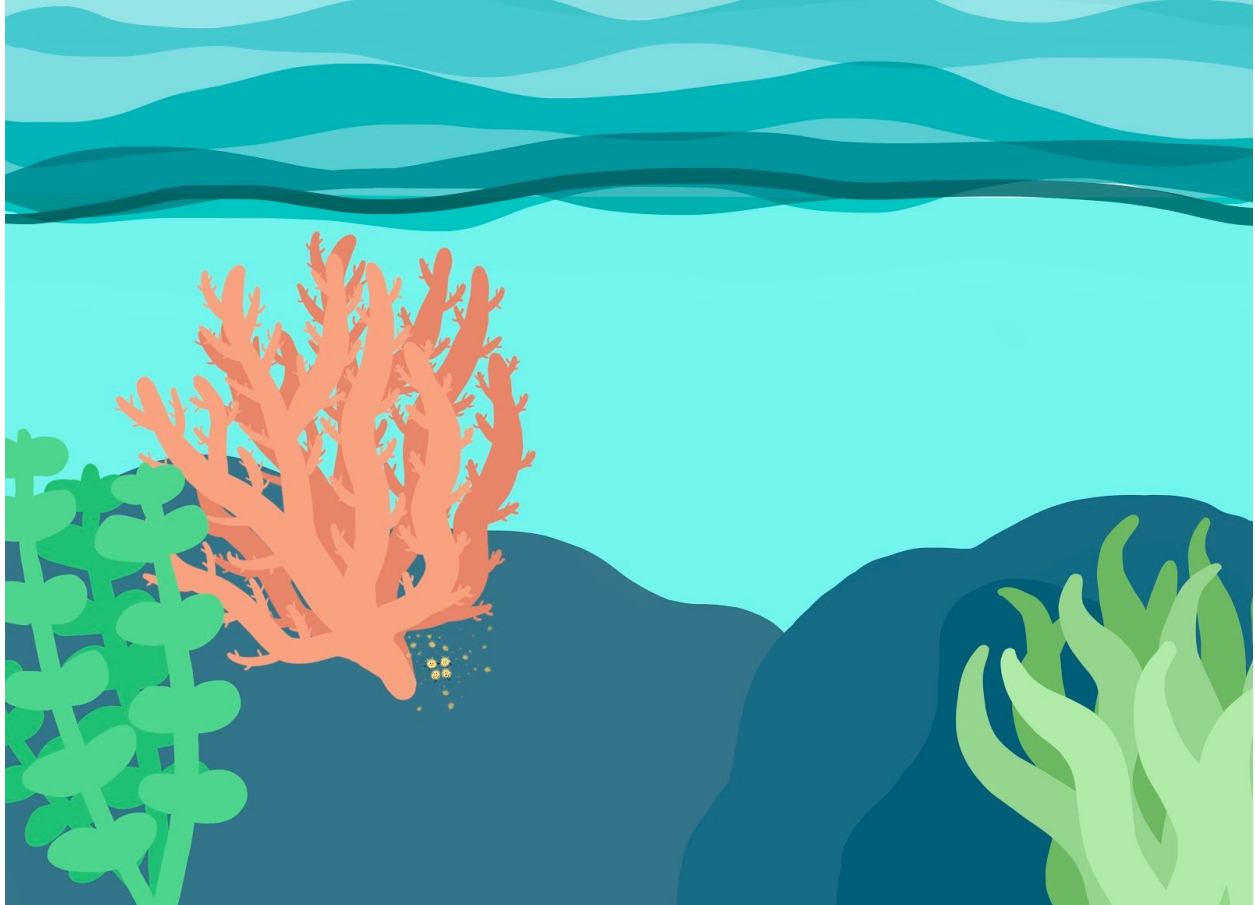
The bright sun shines down on the calm ocean waters. It's the perfect day to play at the beach. "Dad, let's go!" cries Lana as she runs out the door. The sparkling ocean calls her name, but she spots something unusual in the water. What could it be?



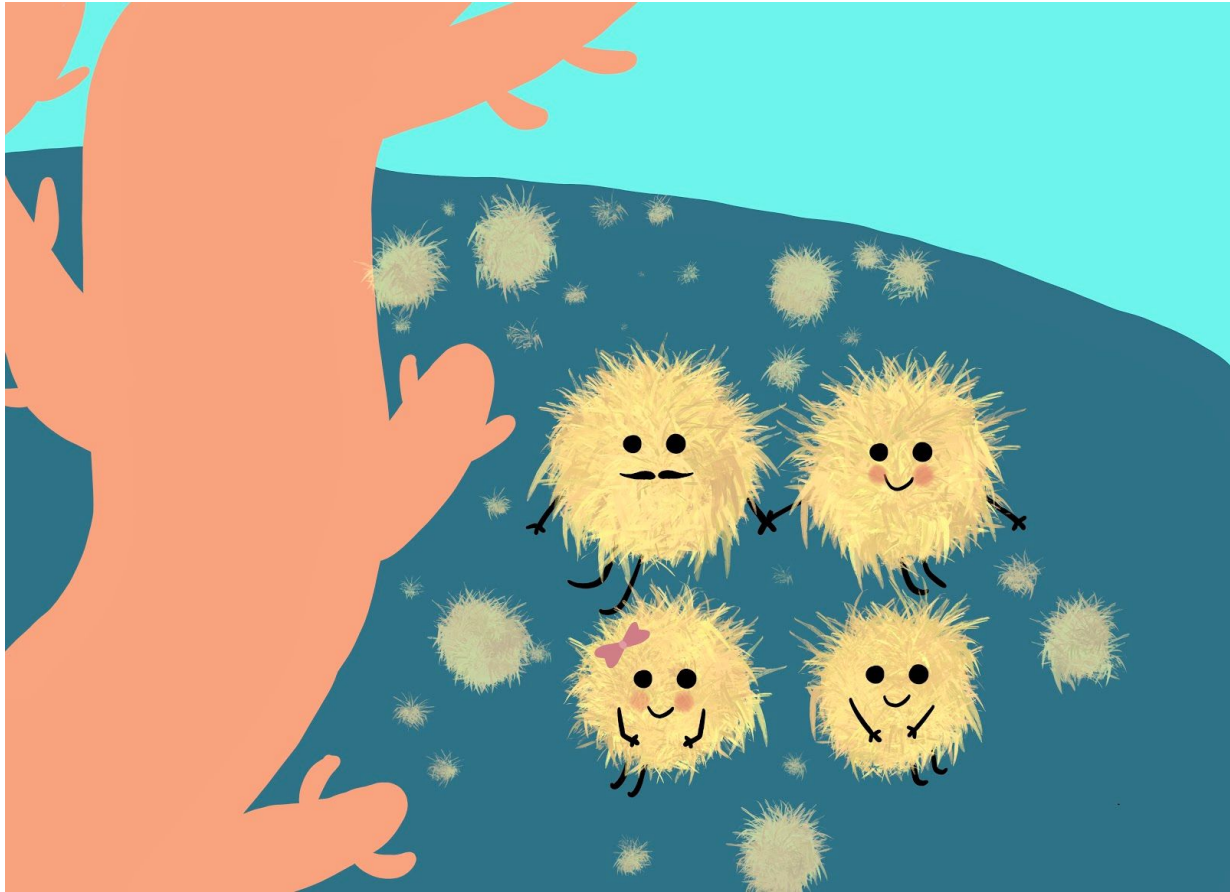
Lana pulls on her dad's hand as she runs towards the shore with excitement. When they finally reach the water, she can see it clearly. It looks like it is part of the ocean, but it's green and cloudy. She's too nervous to go near the water. She grips her dad's hand tight. "What is that?" She asks timidly.



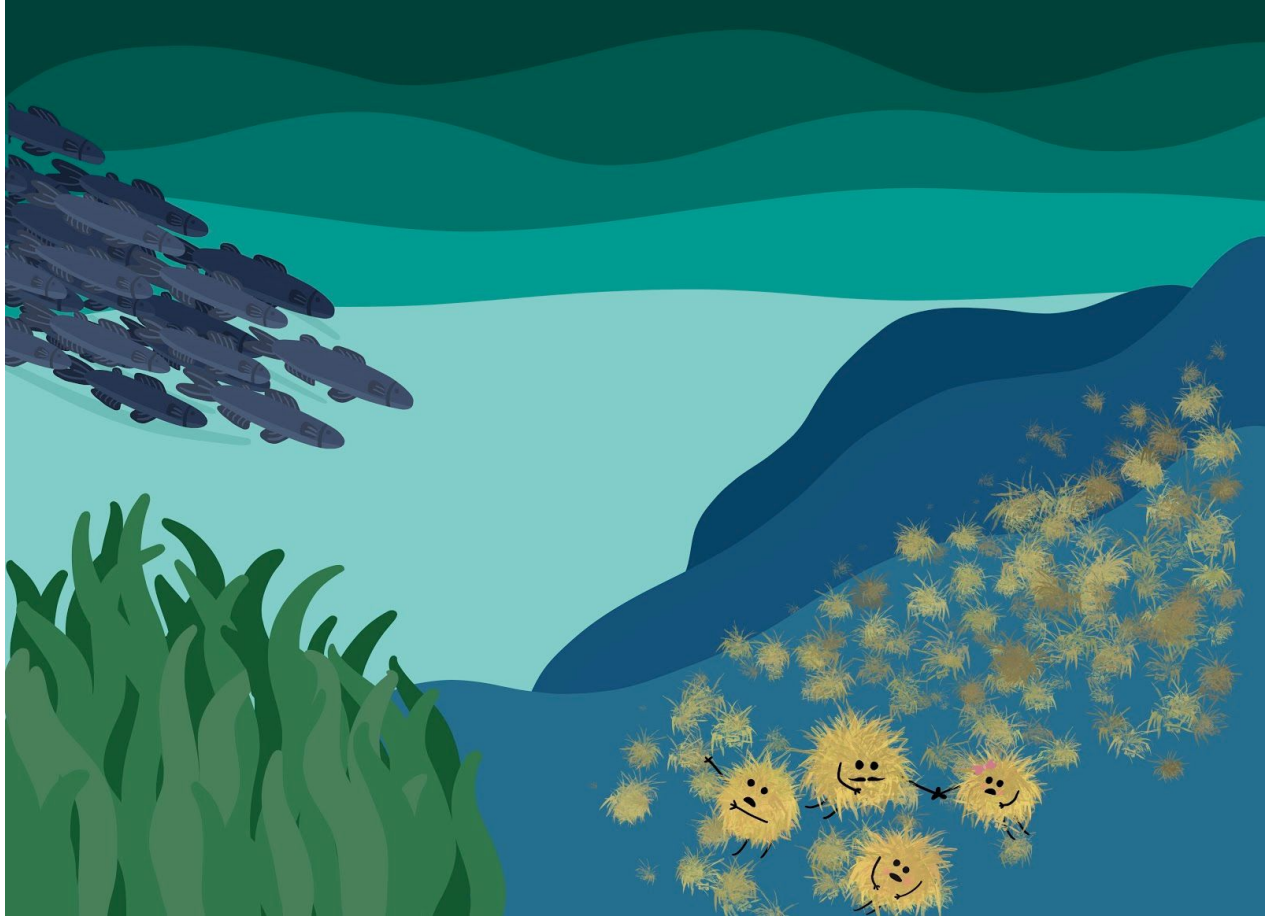
Her dad watches the dark green waters in amazement. "Wow Lana! I can't believe we're actually seeing an algal bloom! It's when LOTS of phytoplankton come together. You can't usually see them without a microscope because they're so tiny. But during an algal bloom there are so many phytoplankton, we can see them in the water!"



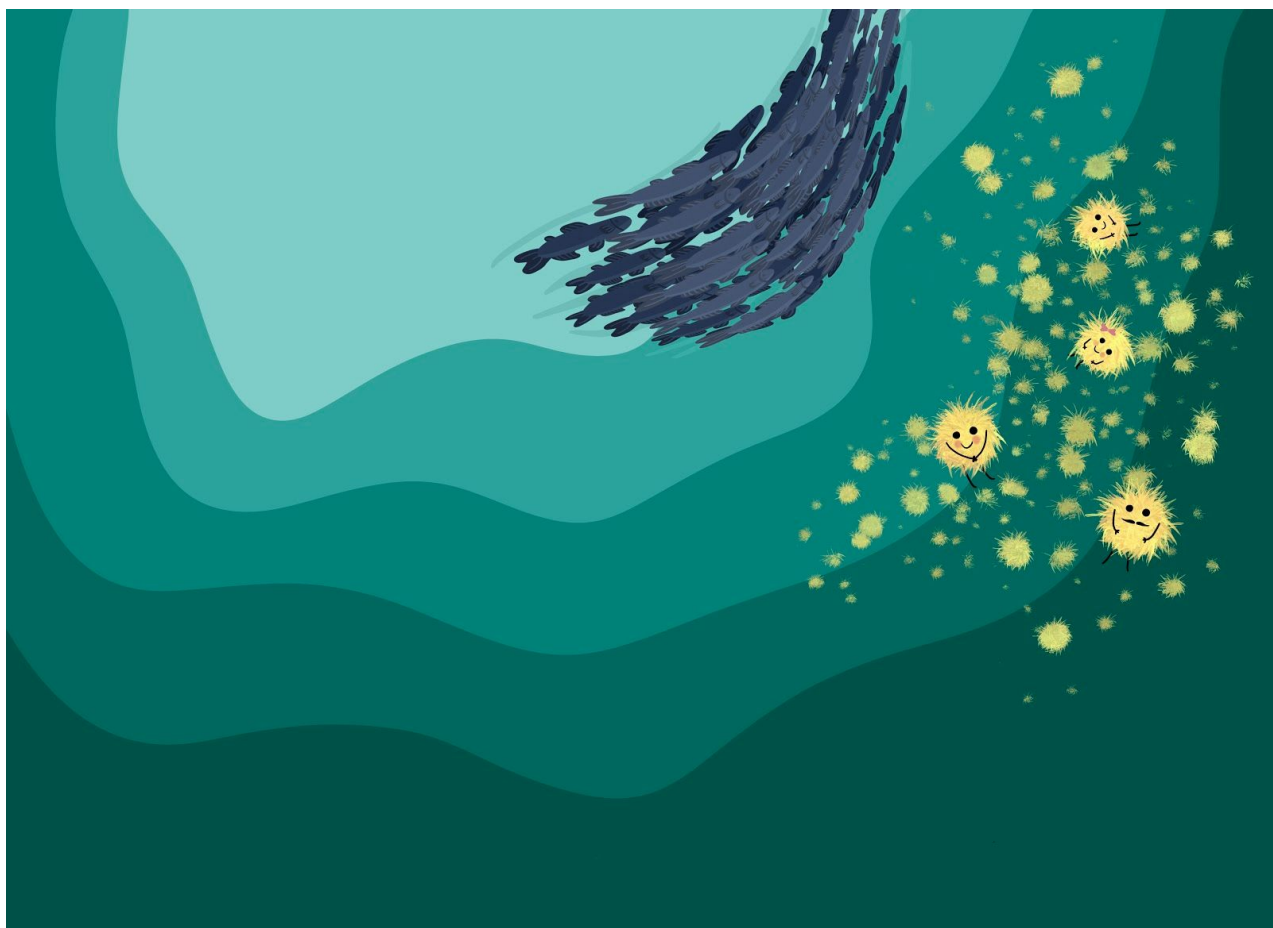
"These phytoplankton are especially important," her dad continues. "Plants give us oxygen to breathe, and phytoplankton are the tiniest plants on earth. Even though they are so small, they create half of the oxygen for the whole world." Lana takes a big, deep breath and tries to make sense of what her dad is saying. She sees plants everyday, but has never seen phytoplankton before. She wonders what they are like...



Phil the phytoplankton and his sister Flora float around, almost invisible next to the big coral that looms over their family. His dad always tells him that one day he will take over the family business of creating oxygen for the world. It sounds like a big job, but his dad did it, and his grandpa, and his great grandpa, and his great great grandpa and his great great great grandpa...



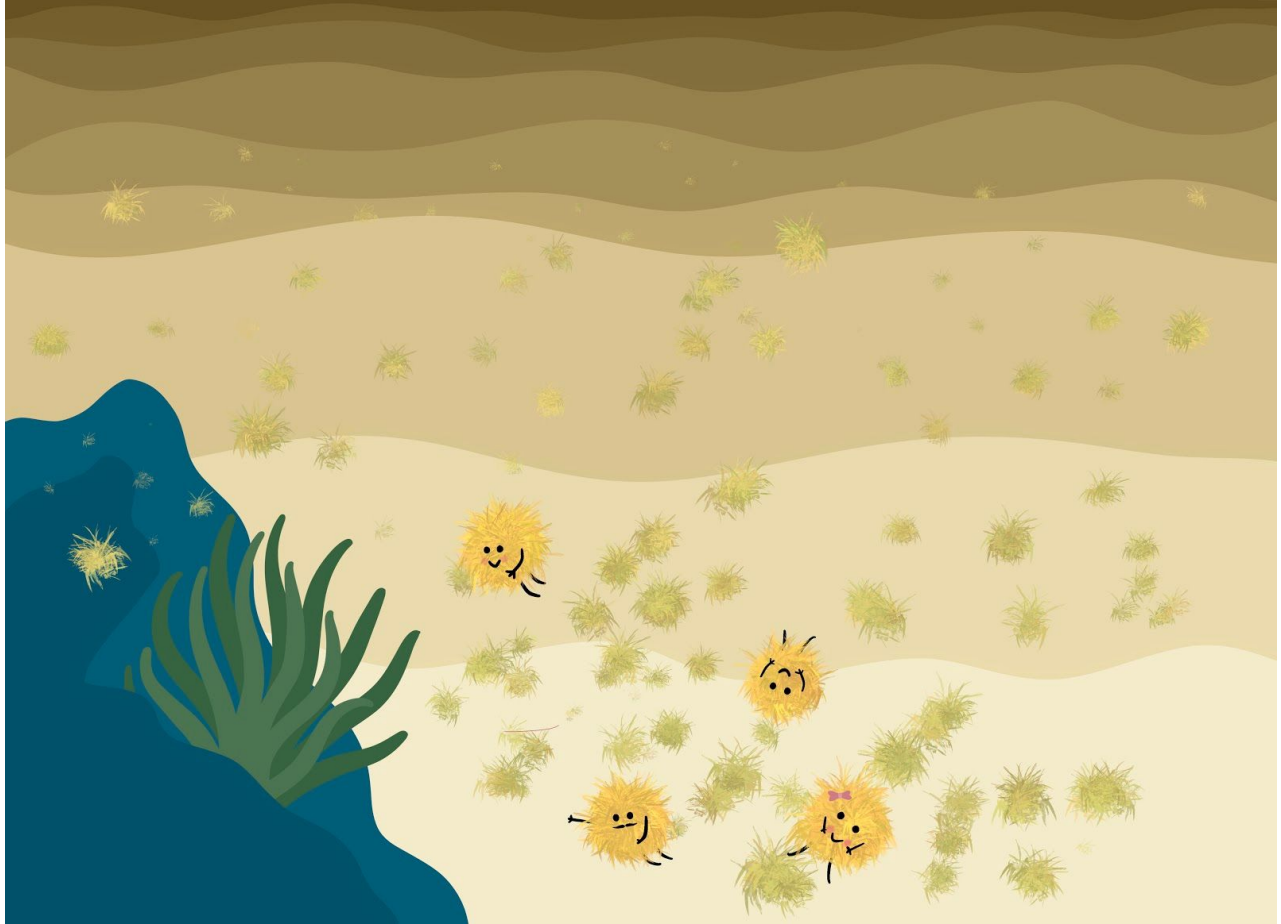
While Phil is thinking about his great great great great grandpa, he notices a big dark cloud swimming towards them! "Look at those!" he shouts. A school of hungry fish swim in their direction looking for a tasty snack as his dad reaches for Flora! .



Luckily, a current swishes past them just in time! Phil and his family are safe, but now they need to find a new home. They catch a ride on the flowing water and forget all about the scary fish.



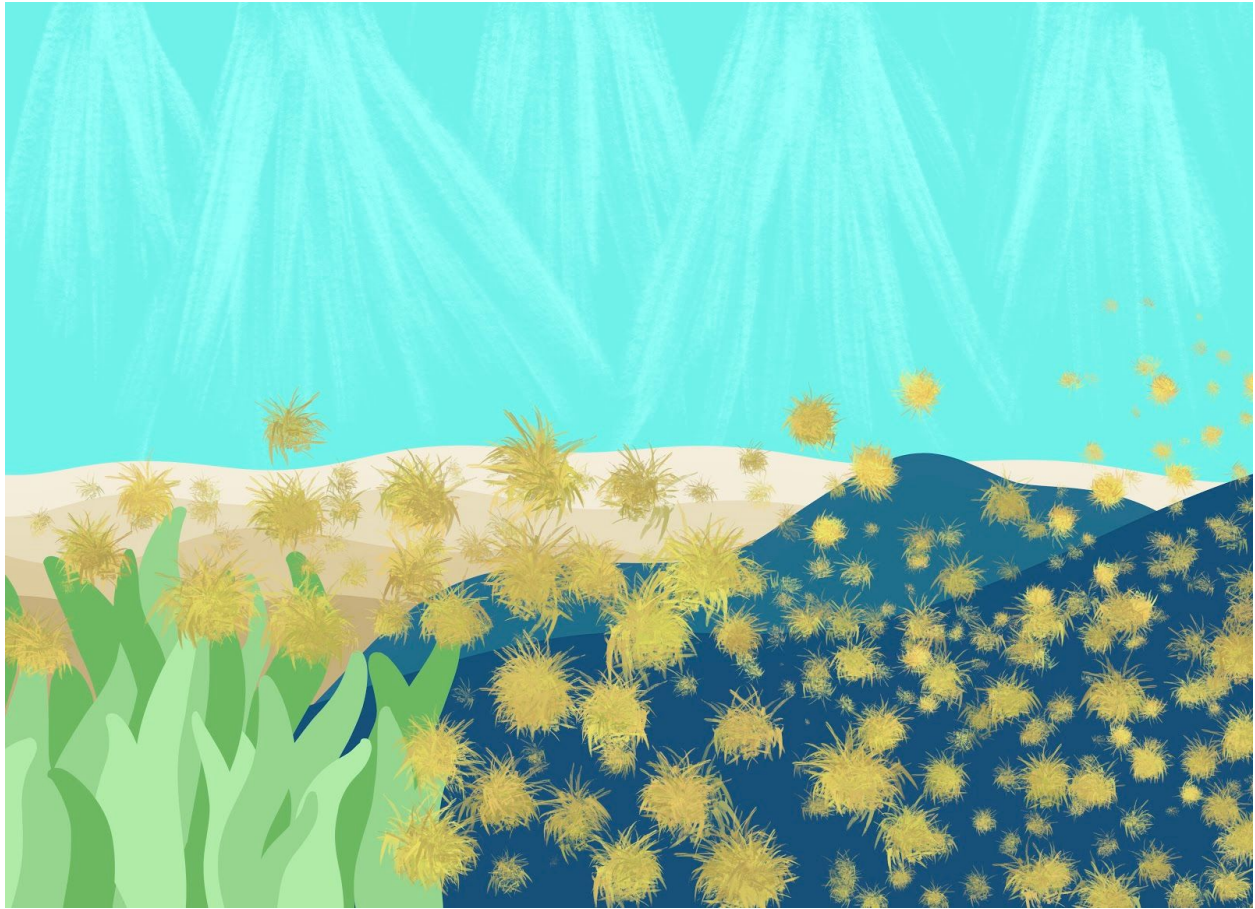
After riding along the underwater stream, Phil and his family find themselves all the way up near the surface of the ocean. They enjoy the energy they get as the warm sun beams down on them. But not for long! Now they're hungry and there's no food anywhere!



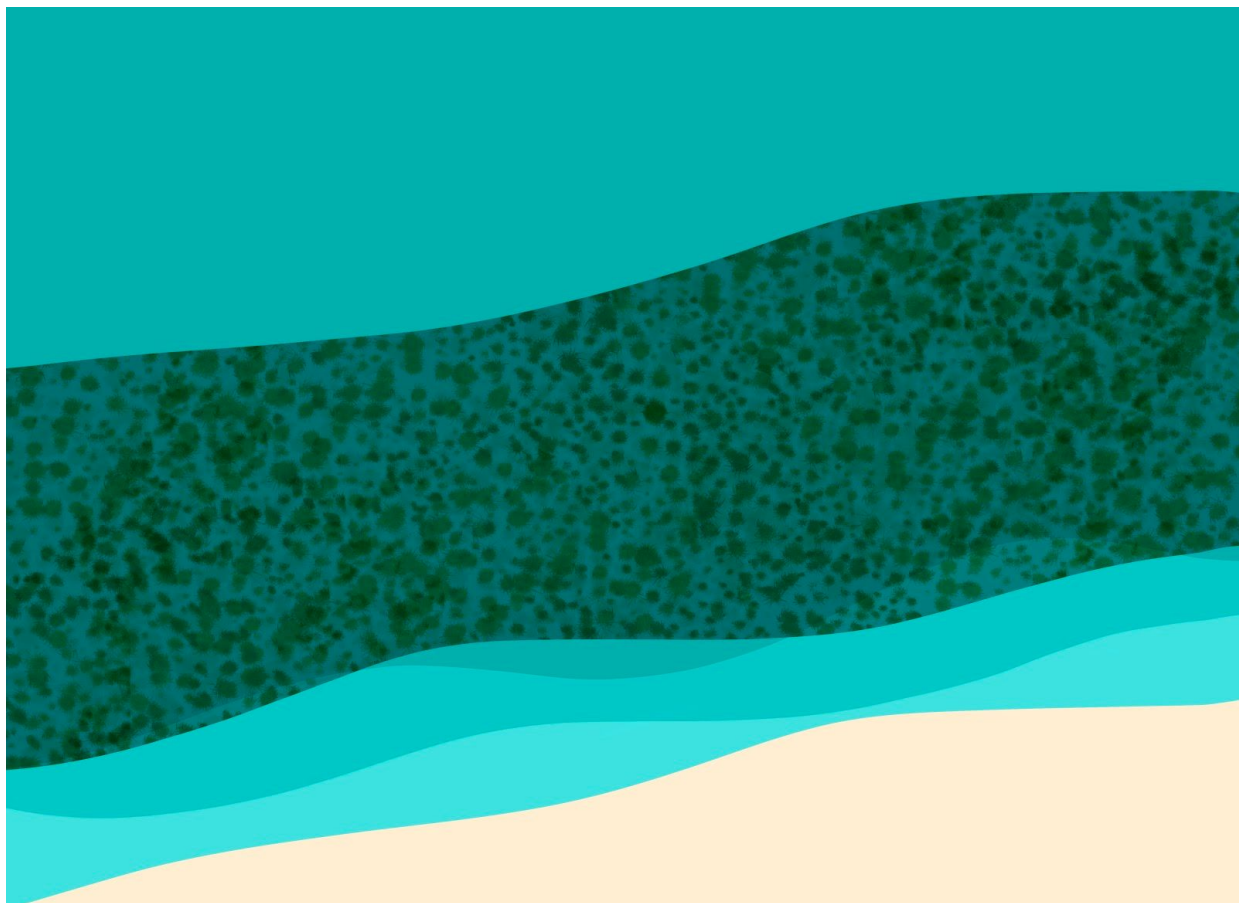
Time to move! They float down down down to the bottom of the ocean. They know they can always find food way down here. They eat away until their bellies are full. They begin to get cold and sleepy. "We gotta keep going," his dad announces. Phil is tired from all the moving and wonders when he'll finally be able to rest.

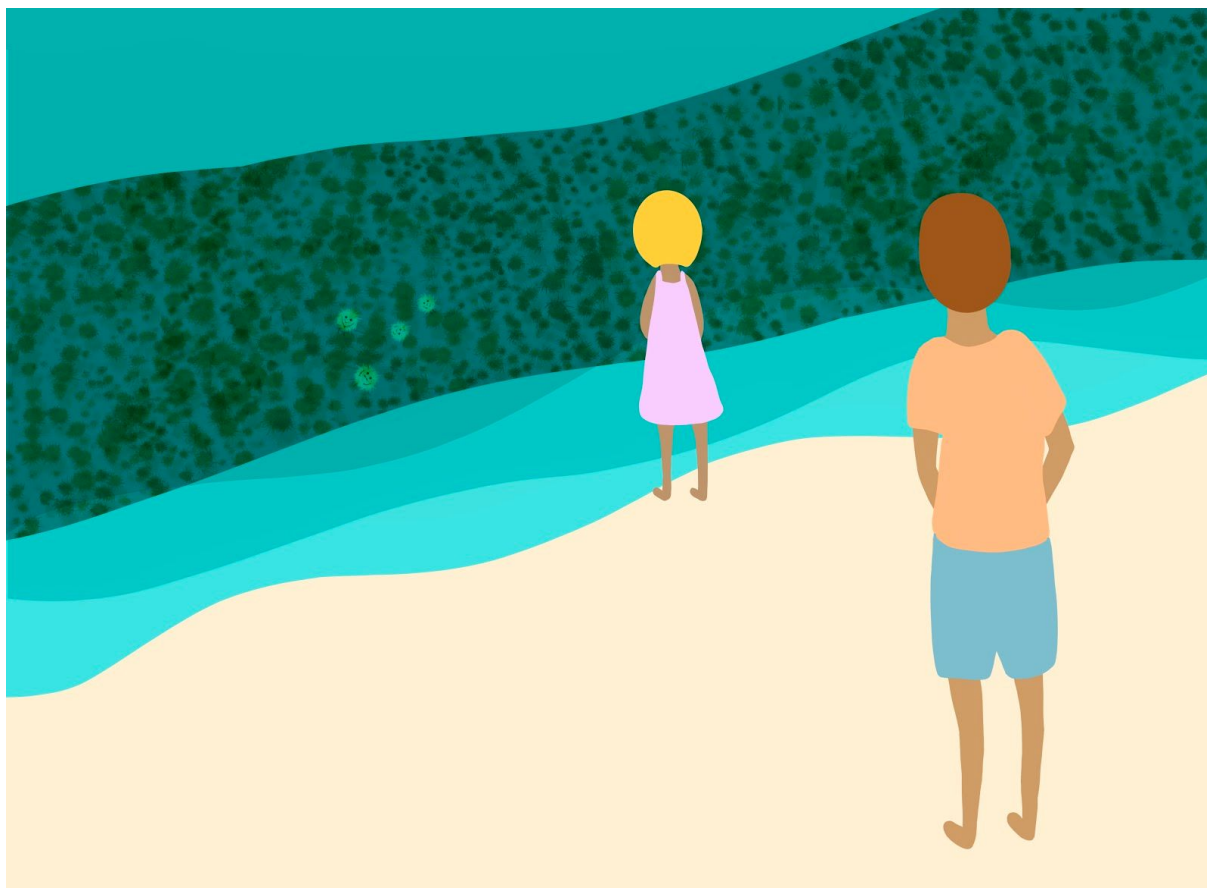


Phil's dad leads them away from the cold, deep waters. As they float up, they find the perfect spot in the middle. "We've reached the euphotic zone," Phil's dad announces proudly. Here they feel the sun's warmth from above, and still have plenty of food from down below. Phil is relieved to finally be home and he closes his eyes to rest from their long journey.



Phil's family is so happy with their new home, they bloom like wildflowers! All the phytoplankton are thrilled to live in the perfect place. With joyful cheers they release oxygen up towards the surface!

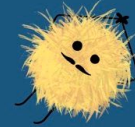




Lana giggles as she thinks about Phil. She's not afraid anymore and she lets the cool water touch her bare toes.

Want to help other ocean life like Phil?

You can...



PICK UP TRASH

It is very important to keep trash out of our oceans because animals can mistake it for food. When they eat trash, they can become extremely sick. You can help by picking up trash when you see it.

BUY REUSABLE ITEMS

It's a good idea to have a reusable water bottle that you can refill over and over. They last much longer than the water bottles that you throw away after one use. The less items we buy and throw away, the less trash we have that can end up in our oceans.

RECYCLE

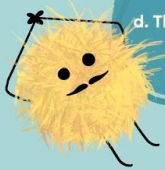
Many items we throw into the garbage everyday can be recycled and used again. Ask your parents to help you look up the recycling guide for your city. It will tell you what items you can recycle in your area. You can print it out or draw pictures of those items to put on your fridge as a reminder for your family.



Let's see what you remember!

What is the zone that is perfect for the Phytoplankton to live called?

- a. The Fun Zone
- b. The Euphotic Zone
- c. The Happy Zone
- d. The Fish Zone



What do you need to see individual phytoplankton?

- a. Special glasses
- b. Perfect eyesight
- c. The sun to be out
- d. A microscope



About how much oxygen do Phytoplankton generate for the earth?

- a. All
- b. None
- c. Half
- d. Hamburger

What is it called when you can see a lot of phytoplankton on the surface of the ocean?

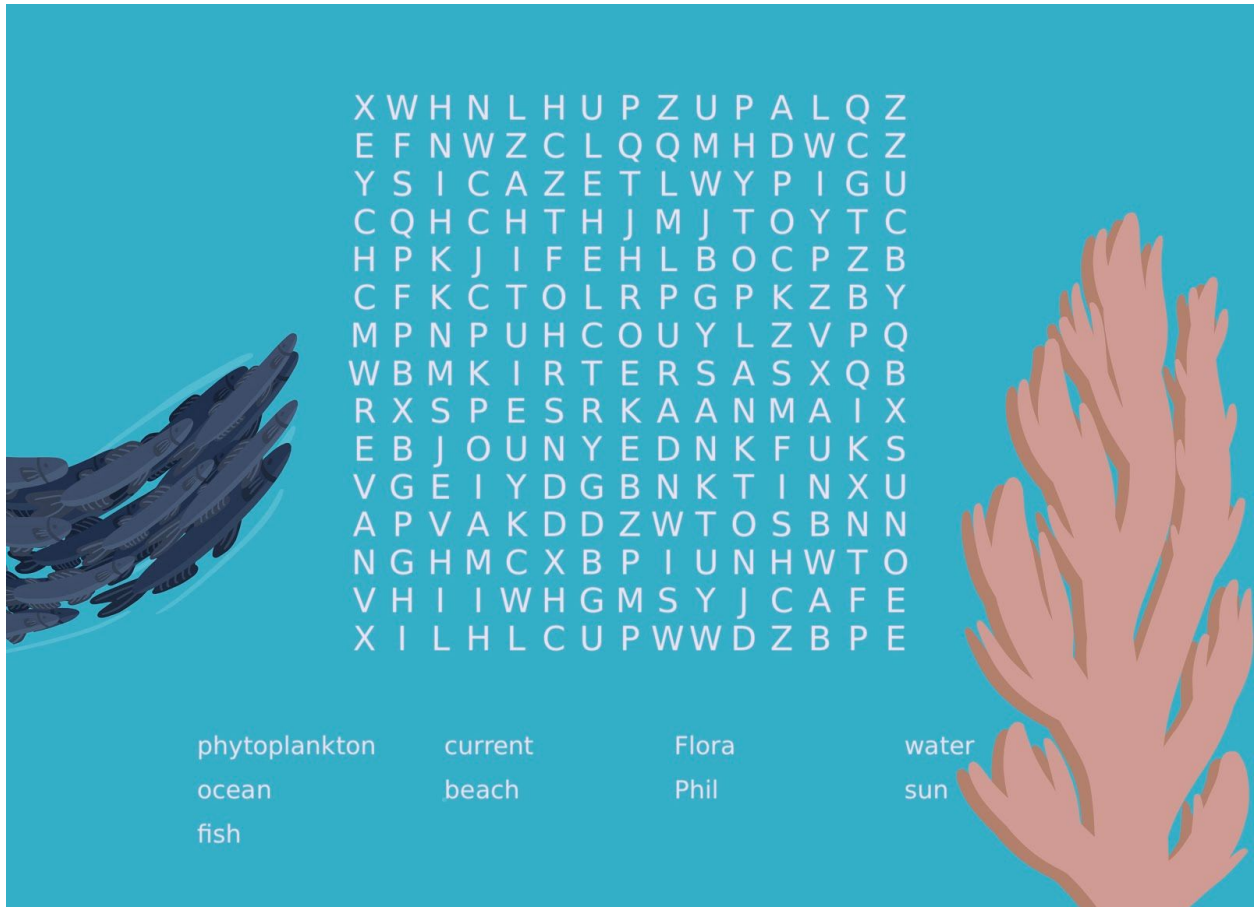
- a. An Algal Bloom
- b. Big Algae
- c. A Family of Phytoplankton
- d. Nothing, you can never see them from the surface



How can we help keep our oceans healthy?

- a. Never leave trash on the beach (and help clean it up when you can!)
- b. Use a reusable water bottle
- c. Recycle
- d. All of the above!






X W H N L H U P Z U P A L Q Z
E F N W Z C L Q Q M H D W C Z
Y S I C A Z E T L W Y P I G U
C Q H C H T H J M J T O Y T C
H P K J I F E H L B O C P Z B
C F K C T O L R P G P K Z B Y
M P N P U H C O U Y L Z V P Q
W B M K I R T E R S A S X Q B
R X S P E S R K A A N M A I X
E B J O U N Y E D N K F U K S
V G E I Y D G B N K T I N X U
A P V A K D D Z W T O S B N N
N G H M C X B P I U N H W T O
V H I I W H G M S Y J C A F E
X I L H L C U P W W D Z B P E

phytoplankton
ocean
fish


current
beach

Flora
Phil


water
sun



algal bloom:
when phytoplankton
have enough food
and warm sun, they
multiply! You can see
them in the water
with only your eyes



current:
water that moves
under the surface



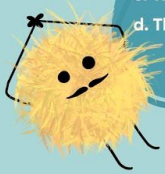
phytoplankton:
teeny tiny plants that
live in the ocean

Vocabulary

Let's see what you remember!

What is the zone that is perfect for the Phytoplankton to live called?

- a. The Fun Zone
- b. The Euphotic Zone**
- c. The Happy Zone
- d. The Fish Zone



What do you need to see individual phytoplankton?

- a. Special glasses
- b. Perfect eyesight
- c. The sun to be out
- d. A microscope**



About how much oxygen do Phytoplankton generate for the earth?

- a. All
- b. None
- c. Half**
- d. Hamburger

What is it called when you can see a lot of phytoplankton on the surface of the ocean?

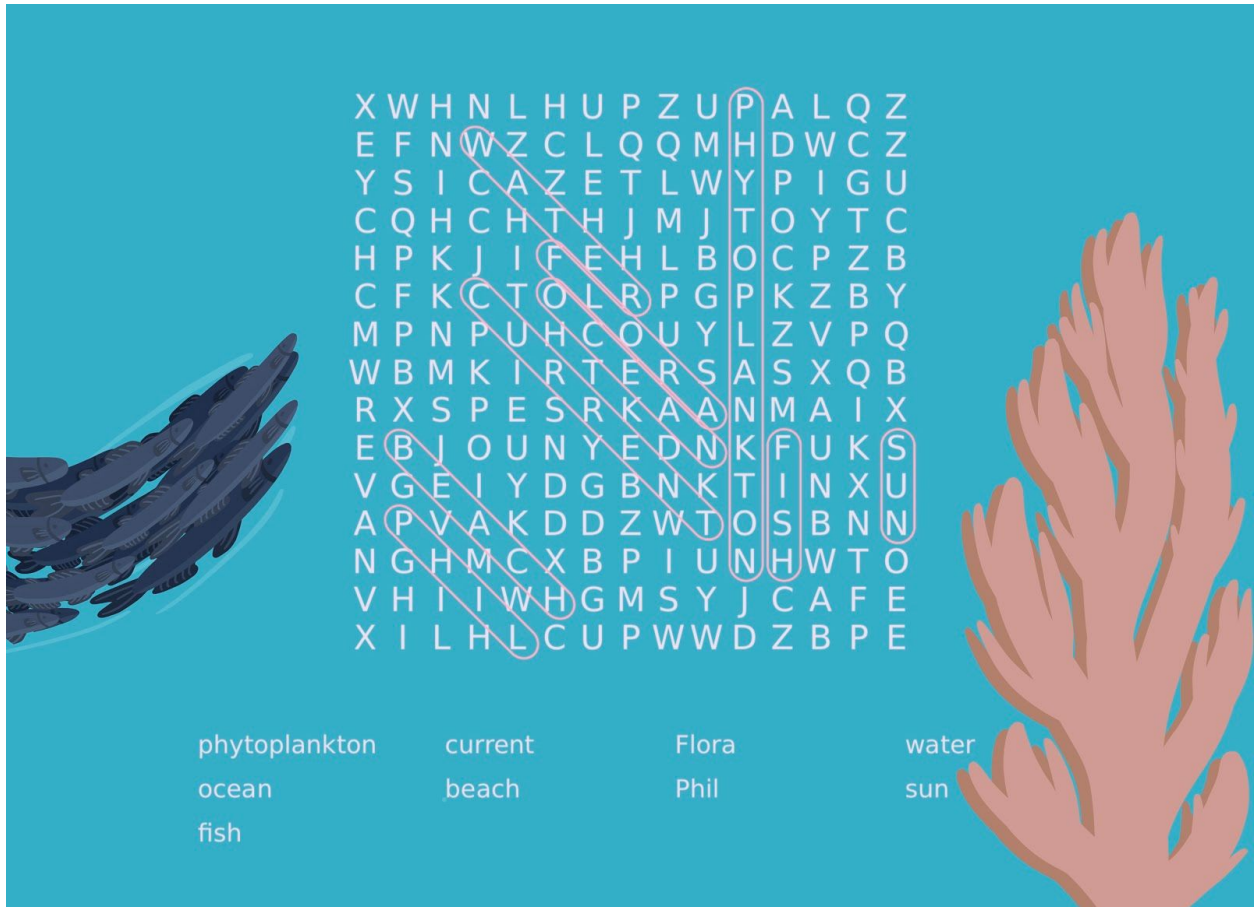
- a. An Algal Bloom**
- b. Big Algae
- c. A Family of Phytoplankton
- d. Nothing, you can never see them from the surface



How can we help keep our oceans healthy?

- a. Never leave trash on the beach (and help clean it up when you can!)
- b. Use a reusable water bottle
- c. Recycle
- d. All of the above!**







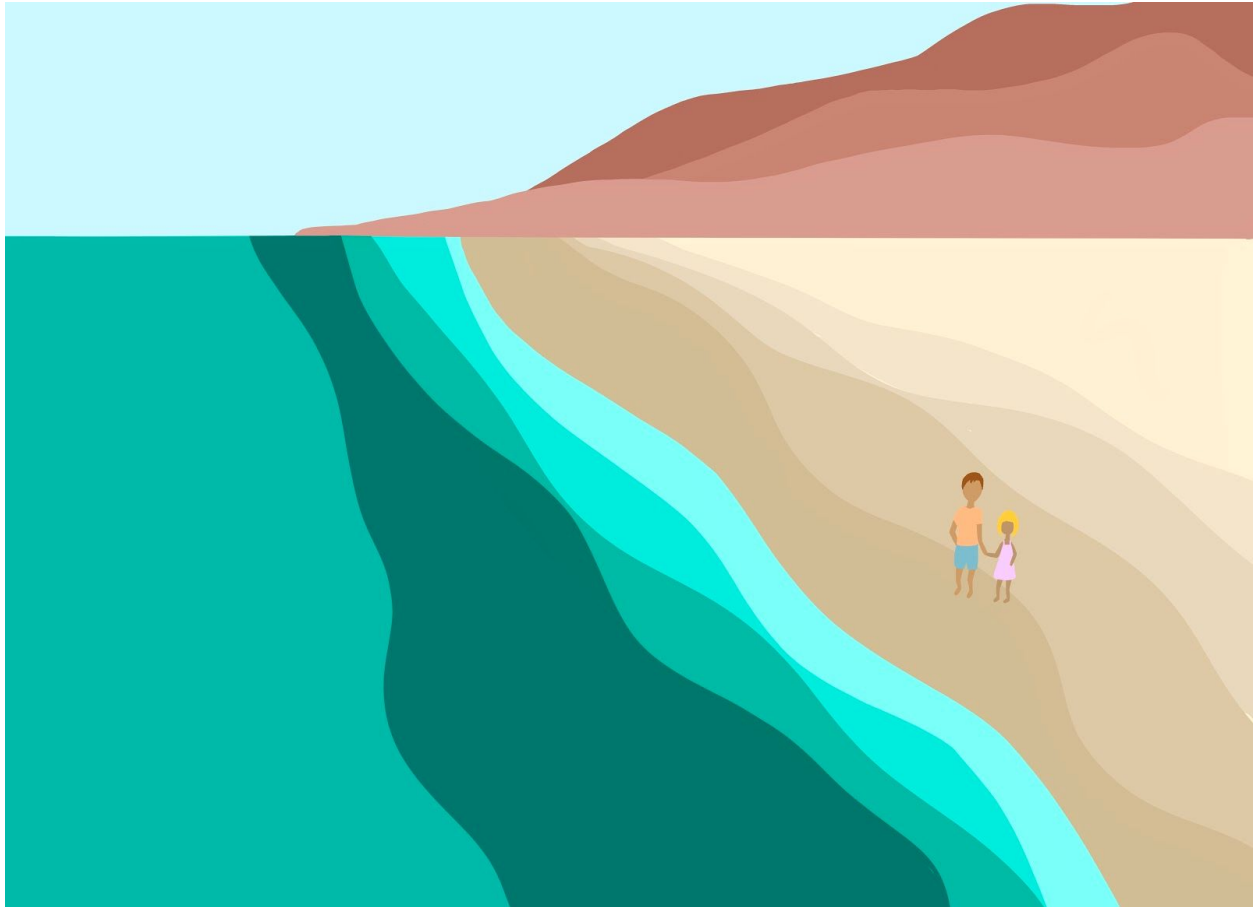
Este libro está dedicado a todos los profesores del Departamento de Lenguas y Literaturas Modernas de Cal Poly, San Luis Obispo, que nos transmitieron una pasión contagiosa por el aprendizaje.



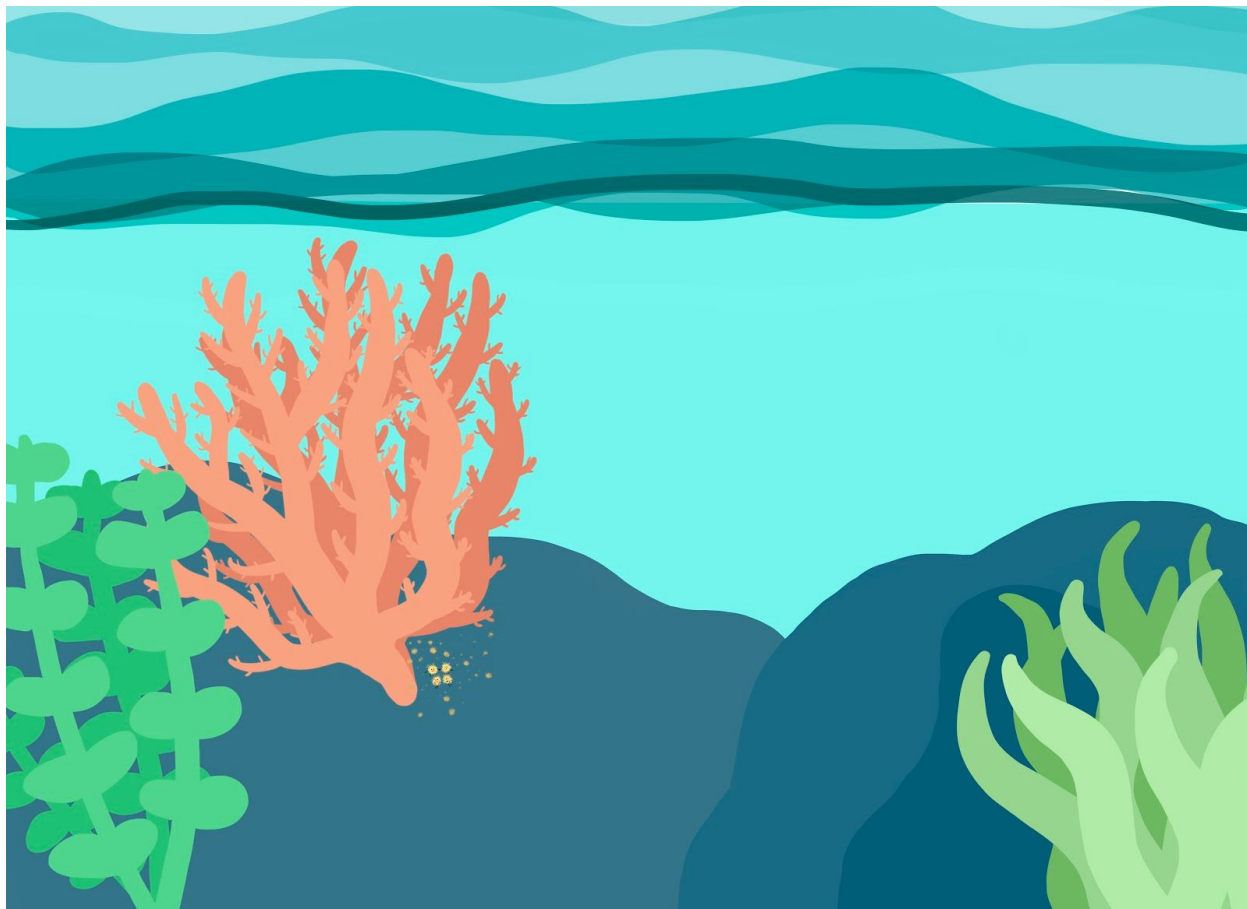
El sol radiante brilla sobre las tranquilas aguas del océano. Es el día perfecto para jugar a la playa. “Papá, ¡vámonos!” grita Lana mientras corre afuera. El océano brillante la llama por su nombre, pero ella ve algo inusual en el agua. ¿Qué podría ser?



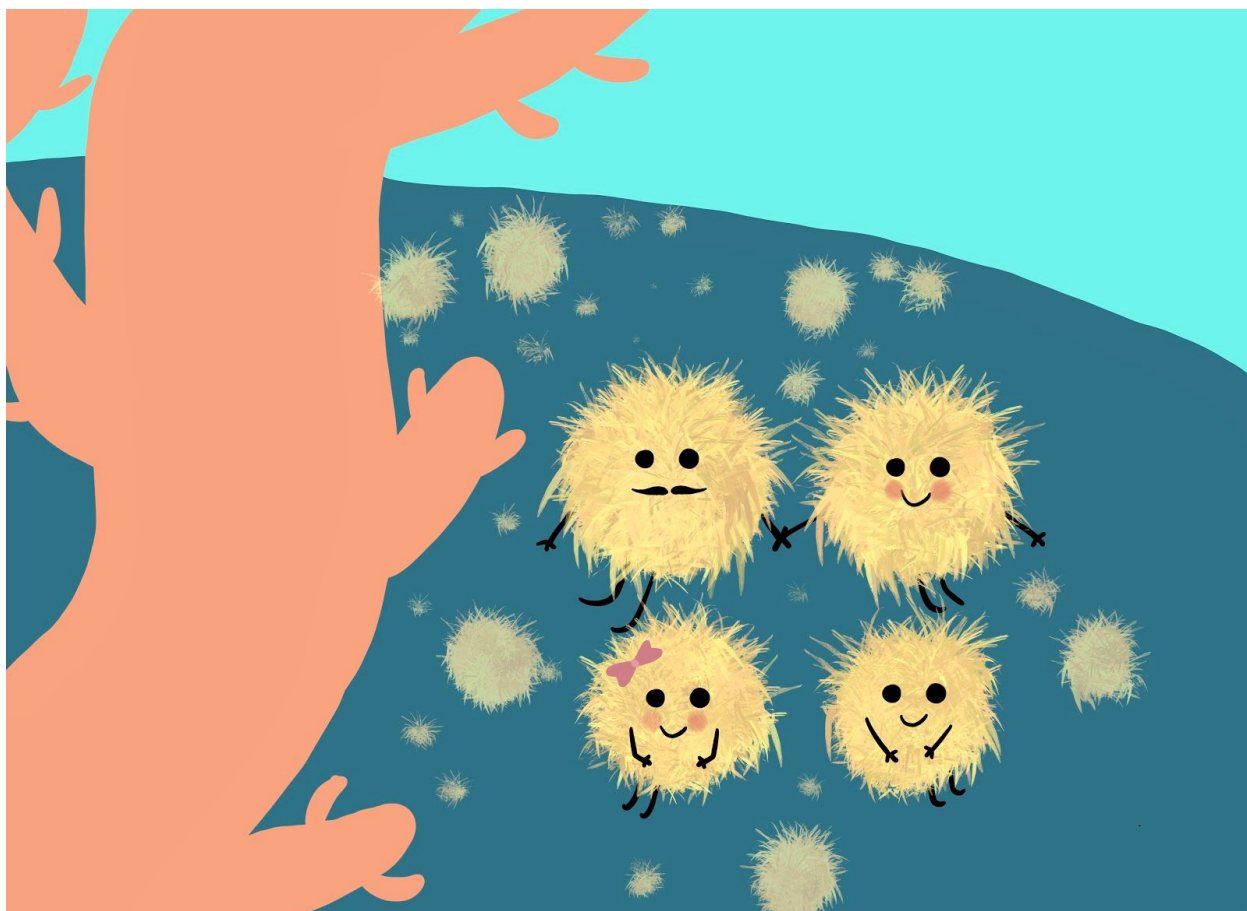
Lana tira de la mano de su papá mientras corre hacia la costa con entusiasmo. Finalmente cuando llegan al agua, ella puede verla claramente. Parece que es parte del mar, pero es verde y turbio. Está demasiado nerviosa para acercarse al agua. Agarra el mano de su papá con fuerza. “¿Qué es eso?” Lana le pregunta tímidamente.



Su papá está fascinado y mira las aguas verdes oscuras. “¡Guau Lana! ¡No puedo creer que estamos viendo una floración de algas! Pasa cuando MUCHOS fitoplancton se reúnen. Usualmente no se pueden ver sin un microscopio porque son muy pequeños. Pero durante una floración de alga hay tantos fitoplancton y ¡podemos verlos en el agua!



“Los fitoplancton son especialmente importantes”, continúa su papá. “Las plantas nos dan el oxígeno para respirar, y los fitoplancton son las plantas más minúsculas de la tierra. Aunque son muy pequeñas, producen la mitad del oxígeno para todo el mundo.” Lana respira hondo e intenta entender lo que dice su padre. Ve las plantas todos los días, pero nunca había visto los fitoplancton. Ella se pregunta cómo son...



Felipe el fitoplancton y su hermana Flora flotan, casi invisible al lado del gran coral que está sobre su familia. Su papá siempre le dice que un día va a encargarse del negocio de la familia de crear oxígeno para el mundo. Parece un trabajo grande pero su papá lo hizo, y su abuelo, y su bisabuelo, y su tatarabuelo...



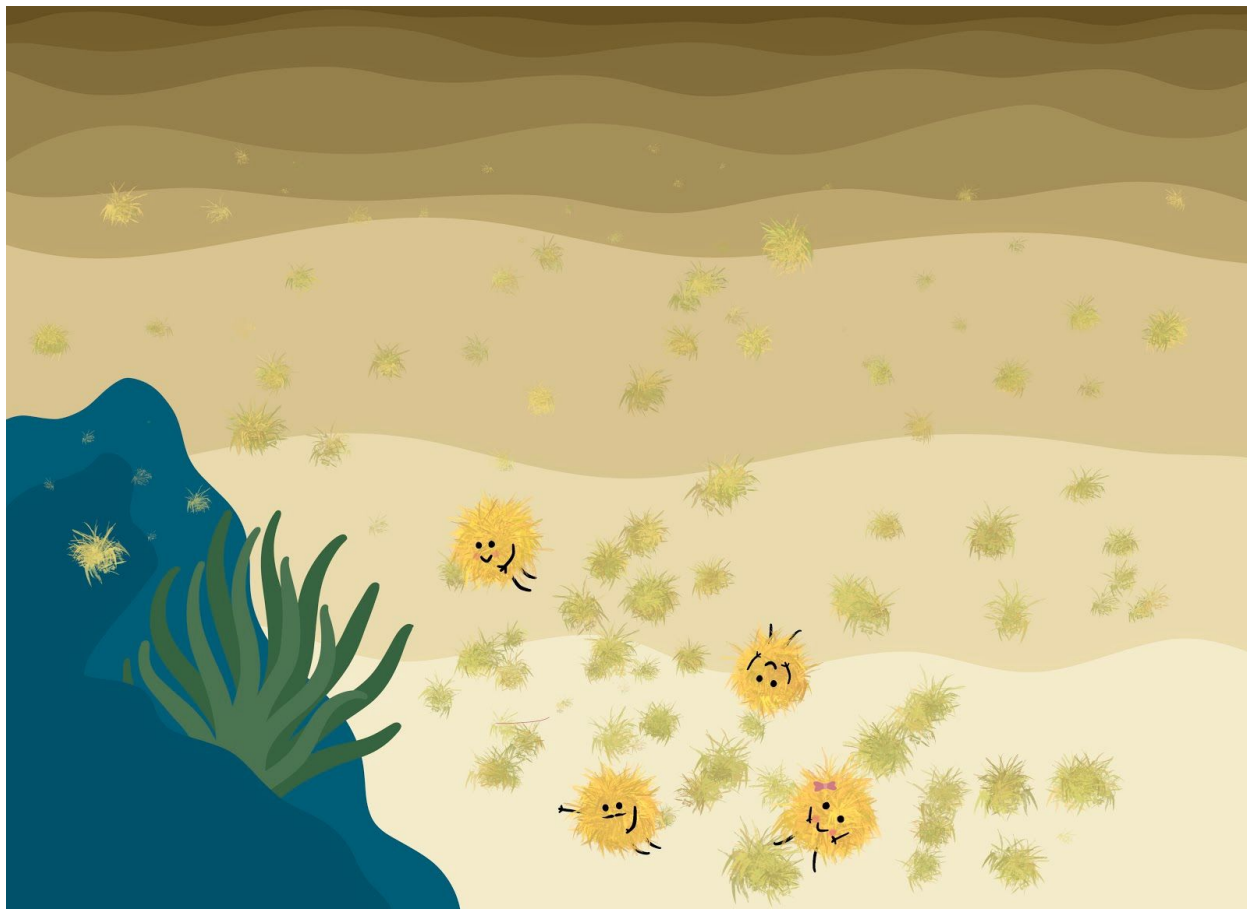
Mientras Felipe piensa en su tatara tatara tatara tatarabuelo, ¡se da cuenta que un gran nube oscura nada hacia ellos! “¡Mira eso!” él grita. Un banco de peces hambrientos nada en su dirección en busca de un sabrosa bocadilla mientras su papá agarra a Flora.



Por suerte, ¡una corriente pasa justo a tiempo! Felipe y su familia están seguros, pero ahora necesitan encontrar un nuevo hogar. Ellos toman un paseo en el agua fluido y se olvidan de los peces siniestros.



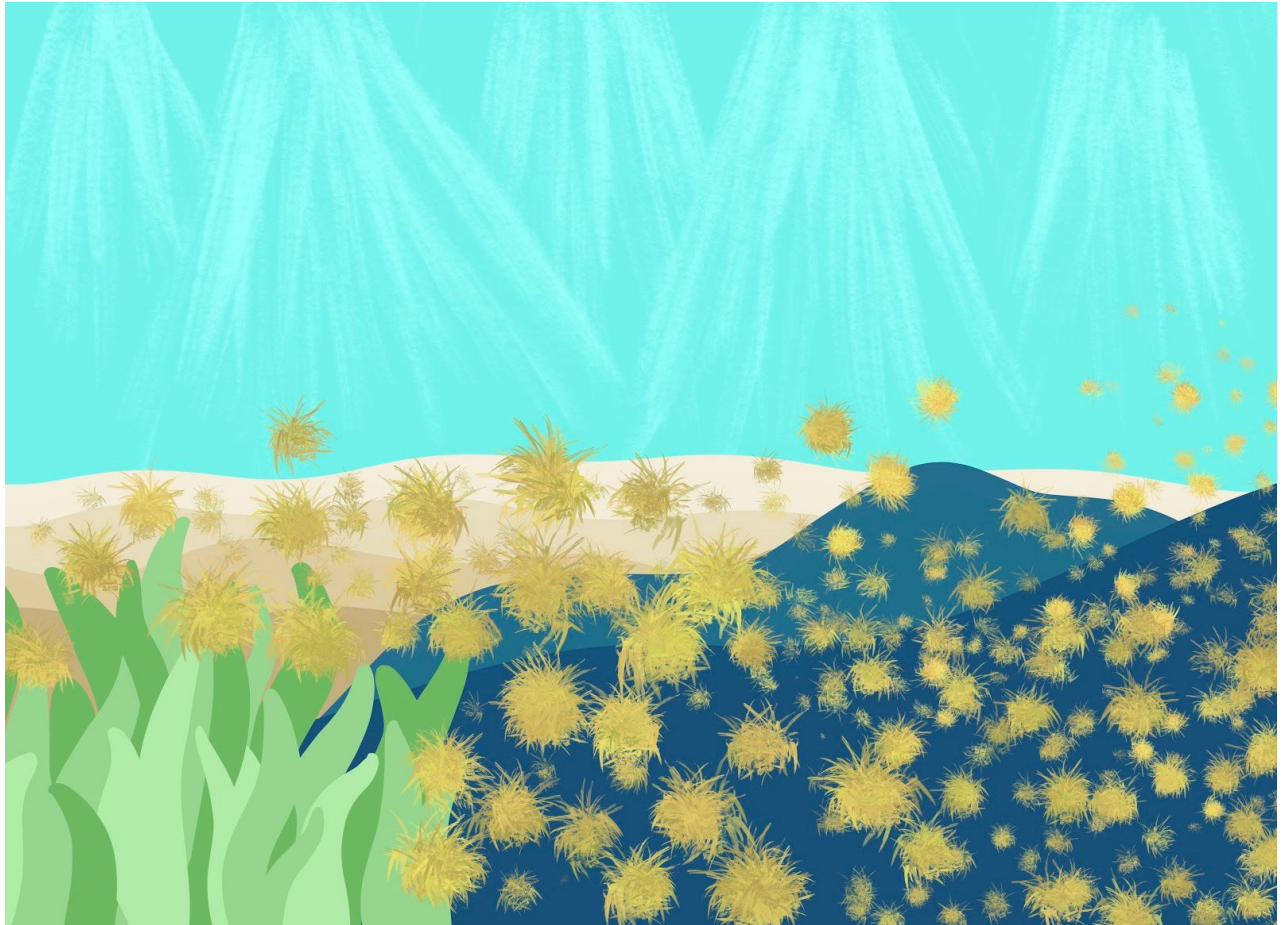
Después del viaje sobre el corriente submarina, Felipe y su familia se encuentran cerca de la superficie del océano. Disfrutan de la energía que reciben cuando el cálido sol los irradia. ¡Pero no por mucho! Ahora tienen hambre y ¡no hay comida en ningún lado!



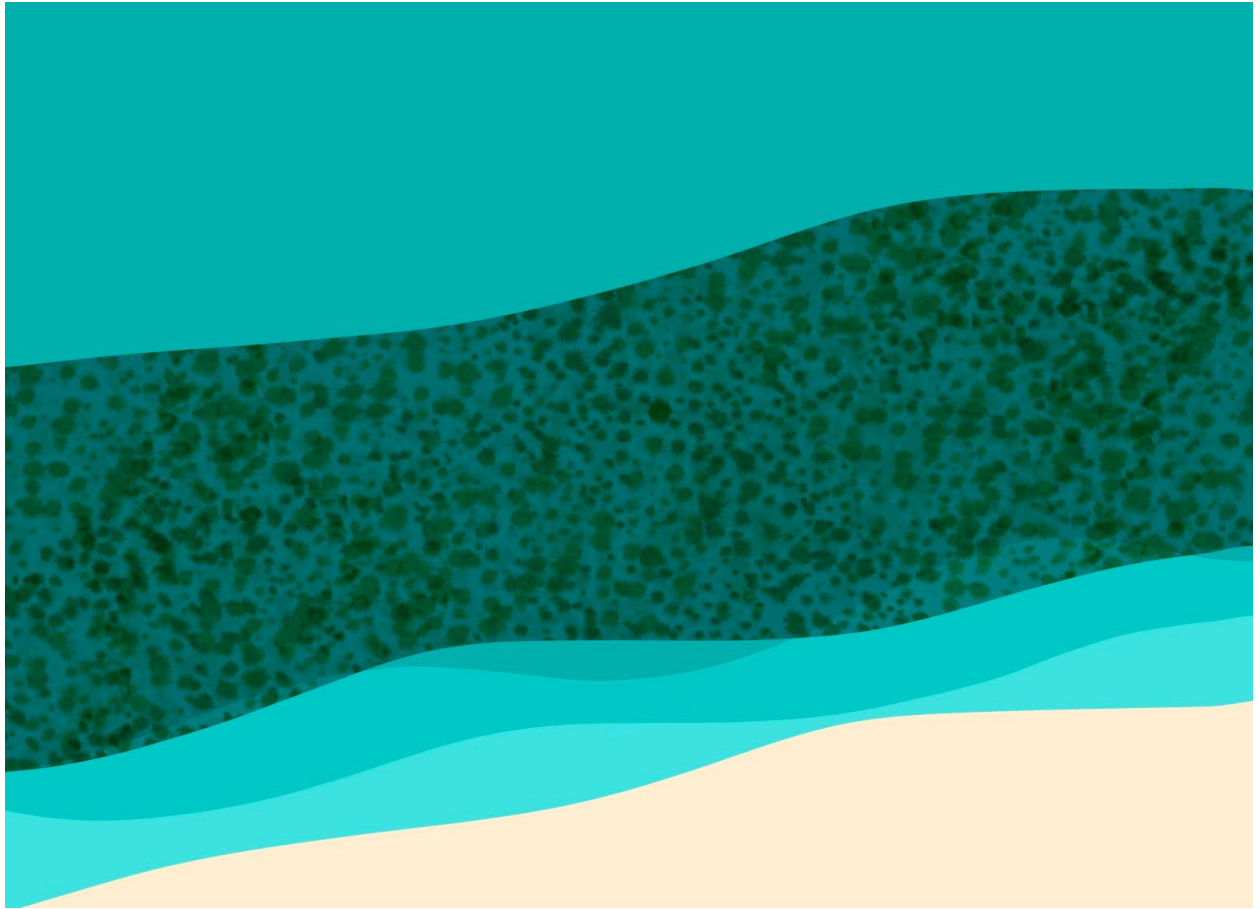
¡Tiempo de mudarse! Ellos bajan flotando hasta el fondo del océano. Saben que siempre pueden encontrar comida aquí abajo. Comen hasta que sus barrigas están llenas. Empiezan a tener frío y a estar cansados. “Tenemos que seguir adelante,” su papá anuncia. Felipa está cansado de todos los movimientos y se pregunta cuando finalmente podrá descansar.

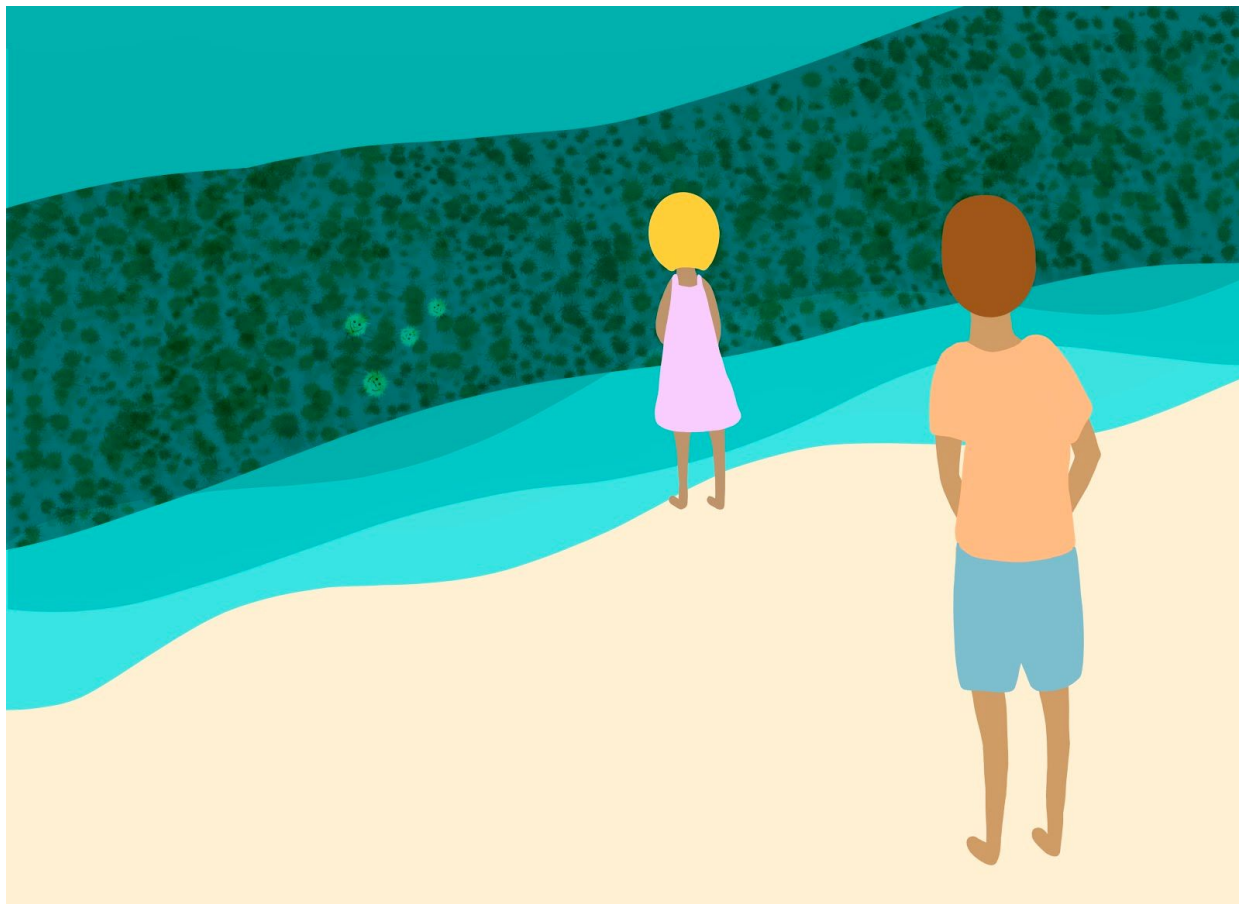


El papá de Felipa los aleja de las aguas frías y profundas. A medida que flotan, encuentran el lugar perfecto en el medio. “Hemos llegado a la zona fótica,” anuncia orgulloso el papá de Felipe. Aquí sienten el calor del sol desde arriba y todavía viene mucha comida desde abajo. Felipe se siente aliviado de estar finalmente en casa y cierra los ojos para descansar de su largo viaje.



La familia de Felipe está tan feliz con su nuevo hogar, ¡que ellos florecen como las flores!
Todos los fitopláctones están emocionados de vivir en el lugar perfecto. ¡Con vítores alegres liberan oxígeno hacia la superficie!





Lana se ríe mientras piensa en Felipe. Ya no tiene miedo y deja que el agua fría toque sus dedos del pies desnudos.

¿Quiere ayudar a otra vida marina como Felipe?

Puede...



RECOGER LA BASURA

Es muy importante mantener la basura fuera de nuestros océanos porque los animales pueden confundirla con comida. Cuando comen basura, pueden enfermarse extremadamente. Puedes ayudar recogiendo basura cuando la veas.

COMPRAR PRODUCTOS REUTILIZABLES

Es una buena idea tener una botella de agua reutilizable que pueda rellenar una y otra vez. Duran mucho más que las botellas de agua que tiras después de un uso. Cuando compramos menos artículos y tiramos menos cosas, menos basura tenemos que puede terminar en nuestros océanos.

RECICLAR

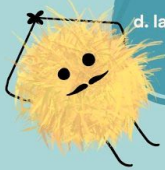
Muchos artículos que tiramos a la basura todos los días se pueden reciclar y volver a usar. Pide a tus padres que te ayuden a buscar la guía de reciclaje de tu ciudad. Le dirá qué artículos puede reciclar en su área. Puede imprimirlo o dibujar imágenes de esos artículos para poner en su refrigerador como un recordatorio para su familia.



¡A ver qué recuerdas!

¿Cuál es la zona perfecta para los fitopláctones a vivir?

- a. la zona de diversión
- b. la zona fótica
- c. la zona de peces
- d. la zona feliz



¿Que se necesita para ver un fitoplancton individual?

- a. lentes especiales
- b. una vista perfecta
- c. el sol
- d. un microscopio



¿Aproximadamente cuánto oxígeno genera los fitoplanctones para el mundo?

- a. todo
- b. nada
- c. la mitad
- d. hamburguesa

¿Como se llama cuando puedes ver muchos fitoplanctones en el océano?

- a. floraciones de algas
- b. alga grande
- c. una familia de fitoplancton
- d. nada, nunca puedes verlo en el superficie



¿Cómo podemos mantener el océano saludable?

- a. Nunca dejar la basura en la playa (¡y ayuda a limpiarla cuando puedes!)
- b. Comprar una botella de agua reusable
- c. Reciclar
- d. ¡Todas las anteriores!






fitoplancton
Flora
pez



corriente
agua

Felipe
sol

oceano
playa



Floraciones de algas:
cuando el fitoplancton
tiene suficiente sol y
comida y se
multiplica. Puedes
verlo en el agua solo
con tus ojos.



Corriente:
el agua que se
mueve debajo de la
superficie



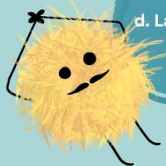
Fitoplancton:
plantas chiquititas
que viven en el
océano

Vocabulario

¡A ver qué recuerdas!

¿Cuál es la zona perfecta para los fitopláctones a vivir?

- a. La Zona de Divertido
- b. La Zona Fótica**
- c. La Zona de Pes
- d. La Zona Feliz



¿Que necesitas para ver un fitoplancton individual?

- a. Los lentes especial
- b. La vista perfecta
- c. El sol
- d. Un microscopio**



¿Aproximadamente cuánto oxígeno genera los fitoplanctones para el mundo?

- a. Todo
- b. Nada
- c. La mitad**
- d. Hamburguesa

¿Como se llama cuando puedes ver muchos fitoplanctones en el océano?

- a. Floraciones de Algas**
- b. Alga Grande
- c. Una Familia de Fitoplancton
- d. Nada, nunca puedes verla en el superficie



¿Cómo podemos mantener el océano saludable?

- a. Nunca dejar la basura en la playa (¡y ayuda a limpiarla cuando puedes!)
- b. Comprar una botella de agua reusable
- c. Reciclar
- d. ¡Todas las anteriores!**





References

Dassow, von, et al. "Unveiling the Mysteries of Phytoplankton Life Cycles: Patterns and Opportunities behind Complexity." *OUP Academic*, Oxford University Press, 25 Oct. 2010, academic.oup.com/plankt/article/33/1/3/1407649.

H, James. "What Type of Fish Eat Phytoplankton?" *Our Pastimes*, 10 Jan. 2019, ourpastimes.com/what-type-of-fish-eat-phytoplankton-12545624.html.

Madin, Kate. "A Day in the Life of a Phytoplankton." *Woods Hole Oceanographic Institution*, 24 Jan. 2013, www.whoi.edu/oceanus/feature/a-day-in-the-life-of-a-phytoplankter/.

"Phytoplankton - A Simple Guide: WHOI." *Woods Hole Oceanographic Institution*, 6 Feb. 2019, www.whoi.edu/know-your-ocean/ocean-topics/ocean-life/phytoplankton/.

"What Are Phytoplankton?" *NASA*, NASA, earthobservatory.nasa.gov/features/Phytoplankton.