



# TEACHER'S GUIDE

PIONEER AND TRAILBLAZER | VOL. 20 NO. 3

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## LEXILE® FRAMEWORK LEVELS

### PIONEER

Waiting to Be Discovered	520L
Seeking Solutions	530L
Protector of the Amazon	550L

### TRAILBLAZER

Waiting to Be Discovered	660L
Seeking Solutions	580L
Protector of the Amazon	700L

## STANDARDS SUPPORTED

- Common Core State Standards (CCSS)
  - Next Generation Science Standards (NGSS)
  - C3 Framework for Social Studies State Standards (C3)
- See each lesson for the specific standard covered.

Educational consultant **Stephanie Harvey** has helped shape the instructional vision for this Teacher's Guide. Her goal is to ensure you have the tools you need to enhance student understanding and engagement with nonfiction text.



Visit [EXPLORERMAG.ORG](http://EXPLORERMAG.ORG) to access digital issues of Explorer magazine in **English** and **Spanish**. Engage students with digital read-alouds, videos, and interactive activities.

# NATIONAL GEOGRAPHIC LEARNING FRAMEWORK

## INTRODUCTION

### BACKGROUND

Since 1888, the National Geographic Society has funded scientists and explorers and shared their findings with the world. To support educators who use our resources, we have created a Learning Framework, which lays out what we believe students should learn from their experiences with the Society.

### PURPOSE

The Learning Framework was designed to convey the Society's core beliefs and values. It is built around a set of attitudes, skills, and knowledge that embody the explorer mindset.

To determine the learning outcomes within the Learning Framework, we dug deep into national standards in key subject areas. We also sought advice from subject matter and child development experts, along with the combined expertise of NG instructional designers, researchers, and content developers. To learn more, go to: <https://www.nationalgeographic.org/education/learningframework/>.

### IMPLEMENTATION

Each article in this magazine has a knowledge-based link to the Learning Framework.

## MINDSET OF AN EXPLORER: KEY FOCUS AREAS

### ATTITUDES



**CURIOSITY** An explorer remains curious about how the world works throughout his or her life. An explorer is adventurous, seeking out new and challenging experiences.

**RESPONSIBILITY** An explorer has concern for the welfare of other people, cultural resources, and the natural world. An explorer is respectful, considers multiple perspectives, and honors others regardless of differences.

**EMPOWERMENT** An explorer acts on curiosity, respect, responsibility, and adventurousness and persists in the face of challenges.

### SKILLS



**OBSERVATION** An explorer notices and documents the world around her or him and is able to make sense of those observations.

**COMMUNICATION** An explorer is a storyteller, communicating experiences and ideas effectively through language and media. An explorer has literacy skills, interpreting and creating new understanding from spoken language, writing, and a wide variety of visual and audio media.

**COLLABORATION** An explorer works effectively with others to achieve goals.

**PROBLEM SOLVING** An explorer is able to generate, evaluate, and implement solutions to problems. An explorer is a capable decision maker—able to identify alternatives and weigh trade-offs to make a well-reasoned decision.

### KNOWLEDGE



**THE HUMAN JOURNEY** An explorer understands where we came from, how we live today, and where we may find ourselves tomorrow.

**OUR CHANGING PLANET** An explorer understands the amazing, intricate, and interconnected systems of the changing planet we live on.

**WILDLIFE AND WILD PLACES** An explorer reveals, celebrates, and helps to protect the amazing and diverse creatures we share our world with.

**Second Grade Standard Supported**

- **CCSS Reading Informational Text: Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text. (2-7)**

**Third Grade Standard Supported**

- **CCSS Reading Informational Text: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-7)**

**What You Will Need**

- “Waiting to Be Discovered” (*Explorer*)
- Think Sheet (Teacher’s Guide, pages 5–6)
- Pencils

**CONNECT & ENGAGE (5 minutes)**

*Display the first two pages of the article “Waiting to Be Discovered.”*

**Say:** Today we are going to be reading about scientist Analyn Cabras. We are going to learn more about her work with beetles. To get us started, I’m going to read aloud the text on the first pages.

*Read aloud the text on the first two pages.*

**Say:** Now take a look at the photo of Analyn Cabras and all of the beetles. What do you notice about the beetles? Take some time to look carefully at all of the beetles, and then turn and talk about what you notice.

*Kids should share some of their observations about the beetles, such as their shapes and sizes, their various colors and markings, and some of their body parts that are similar or that vary from beetle to beetle.*

**MODEL (10 minutes)**

**Say:** I’m going to read aloud this next page. It tells more about Analyn Cabras’ work. As I’m reading, look at the photos and the map.

*Read aloud the text.*

**Say:** The text says that Cabras looks for beetles in Mindanao, an island in the Philippines. I don’t know a lot about the Philippines, so seeing the picture and looking at the map gives me good information about what the landscape looks like and where in the world the Philippines is located. This is very helpful.

**Say:** I have also learned from the text that Cabras has found many beetles called jeweled weevils. There are three different beetles pictured on these pages. I’m wondering if these are some examples of jeweled weevils. I’m guessing they must be.

**Say:** There is more text on this page that seems to be kind of a special feature. It tells the many different roles Cabras plays as a scientist. I think this is really interesting. I’m going to read these aloud to you, then I’d like you to turn and talk about these different roles.

*Read the text and then let kids turn and talk.*

**Say:** I don’t want to forget about that photo of Cabras where she is looking at a beetle up close. That gives me a lot of information, too. I see she has a magnifying glass. That must be an important tool for her when she is working in the field. It magnifies the beetle so she can see more details.

**Say:** This is important stuff to keep track of, if we want to use everything in the article to help us make meaning out of what we are viewing and reading. I’m going to use this Think Sheet chart to write down how the photos, map, and the text help me understand.

*Show kids the three-column Think Sheet chart. In the Image column, write “photos and map”; in the Text column, write the page numbers of the text you read aloud; and in the How They Help Me Understand column, write “help me figure out more about Cabras’ work and where she does it.”*

## GUIDE (10 minutes)

*Make sure kids have access to their own Think Sheets.*

**Say:** I'm going to read aloud the text on the next page. Then we'll look at the photos on the next two pages together. Those photos go with the text I will be reading. Look at them while I read aloud.

*Read the text aloud on the next page.*

**Say:** Okay, the text tells us more about how Cabras works and more information about the beetles she finds. The photos on these pages help us see more, too. Let's take a closer look at those images. Look at and talk through each of the photos with a partner. Read the captions, too.

*Kids turn and talk about the photos with a partner. They should take note of the beetle that became important to Cabras' work and may wonder why. They may be able to infer why from the text. They may also notice that the photo of Cabras using a microscope is evidence of another tool she uses to study the beetles she finds.*

**Say:** Now, with your partner, write your thoughts on your Think Sheets.

## COLLABORATE (25 minutes)

**Say:** Now it's time for you to read with a partner. Go through the rest of the article together, using the photos and text to make meaning. As you are viewing and reading, stop to write down your thoughts about the text and the images on your Think Sheets. And don't forget to write how they help you understand.

*Partners read the rest of the article together, stopping to write their thoughts on the Think Sheets. Confer with partners to answer any questions they have.*

*Kids should note that the photos helped them understand the concept of mimicry and how the mimics truly resemble the models. It is also helpful to view one of Cabras' clay models to see how she went about experimenting to learn whether or not predators would attack her model that used the warning colors.*

## SHARE THE LEARNING (10 minutes)

**Say:** Let's get together and talk about what we learned. I learned that the text and images work together to help us make meaning as we read. Who else would like to share something they learned? Look at your Think Sheets to find examples you would like to share.

*Allow time for kids to share their learning.*

**Say:** We learned so much today about using the text and different kinds of images, such as a map and photos, to help us understand and make meaning as we read. What a great job you all did!

**THINK SHEET**

Write your thoughts in each column.

IMAGES	TEXT	HOW THEY HELP ME UNDERSTAND

**HOJA DE PENSAR**

Escribe tus ideas en cada columna.

<b>IMÁGENES</b>	<b>TEXTO</b>	<b>CÓMO ME AYUDAN A COMPRENDER</b>

This frame is a template of the language arts lesson. It has the instructional moves and language of the lesson, but the specific content has been removed. This way you can use the Lesson Frame for the other articles in the issue or for any nonfiction text you might be teaching.

## What You Will Need

- Nonfiction text
- Think Sheet template
- Pencils

## CONNECT & ENGAGE (5 minutes)

*Display the first page(s) of the article.*

**Say:** Today we are going to be reading about ..... We are going to use the images and the text to help us understand more about ..... To get us started, I'm going to read aloud the text on page ....

*Read aloud the text on page ....*

**Say:** Now take a look at the image(s) [could be photo, map, diagram, etc.].

**Say:** Take some time to look carefully at the image(s), and then turn and talk about what you notice.

*Kids turn and talk about what they notice.*

## MODEL (10 minutes)

**Say:** Now I'm going to continue reading aloud. Listen as I read, and look at the image(s) on the page(s).

*Read aloud page(s) .....*

**Say:** What did you notice about the image(s), and how did that help you understand what you were hearing as I read the text? Turn and talk about that with a partner.

*Kids turn and talk.*

**Say:** This is important stuff to keep track of, if we want to use everything in the article to help us make meaning out of what we are viewing and reading. I'm going to use this Think Sheet chart to write down how the image(s) and the text help me understand.

*Show kids the three-column Think Sheet chart. Write your thoughts in the Image column, the Text column, and the How They Help Me Understand column. Think aloud as you are writing to model for kids how you used the image(s) and text to help you understand and make meaning.*

### GUIDE (10 minutes)

*Make sure kids have access to their own Think Sheets.*

**Say:** I'm going to continue to read aloud. Then we'll look at the image(s) on the page(s) together.

*Read the text aloud on page(s) .....*

**Say:** Okay, the text tells us ..... and the image(s) help us view more about ..... Let's take a closer look at those image(s).

**Say:** Look at and talk through the image(s). Read any captions and check to see if anyone has any questions about what they are viewing.

**Say:** Now turn and talk about the text and the image(s) with your partner and write your thoughts on your Think Sheets.

### COLLABORATE (25 Minutes)

**Say:** Now it's time for you to read with a partner. Go through the rest of the article together, using the images and text to make meaning. As you are viewing and reading, stop to write down your thoughts about the text and the images on your Think Sheets. And don't forget to write how they help you understand.

*Partners read the rest of the article together, stopping to write their thoughts on the Think Sheets. Confer with partners to answer any questions.*

### SHARE THE LEARNING (10 minutes)

**Say:** Let's get together and talk about what we learned. I learned that the text and images work together to help us make meaning as we read. Who else would like to share something they learned? Look at your Think Sheets to find examples you would like to share.

*Allow time for kids to share their learning.*

**Say:** We learned so much today about using the text and different kinds of images, such as a map and photos, to help us understand and make meaning as we read. What a great job you all did!



# WAITING TO BE DISCOVERED

## SCIENCE

### Standards Supported

- **NGSS Connections to Nature of Science: Scientific Knowledge is Based on Empirical Evidence:** Scientists look for patterns and order when making observations about the world. (2-LS4-1)
- **NGSS LS4.C: Adaptation:** For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

### What You Will Need

- Interactive Digital Magazine
- Content Assessment (English and Spanish) (pages 10–11)
- Article Test (English and Spanish) (pages 18–19)

### SCIENCE BACKGROUND

National Geographic Explorer Analyn Cabras is a coleopterist, or scientist who studies and collects beetles. She searches for the insects high up in the rainforests of the Philippines' Mindanao Island.

Identifying beetles isn't always easy. Many species look a lot alike. Cabras suspected there was a reason for that. Some beetles are poisonous or taste bad. Their colors, patterns, sounds, or smells warn predators to stay away. Cabras thought the beetles were mimicking, or copying, each others' traits to stay safe.

To test her hypothesis, she made clay models that looked like a poisonous beetle. Predators avoided the models in places where the beetles were common and attacked them where they weren't. Her test provided new insight into how beetle behaviors and anatomy have evolved to help them survive.

### ENGAGE

Encourage students to review the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they know about beetles.

### EXPLORE

Display the "**Waiting to Be Discovered**" article with the interactive digital magazine. As a class brainstorm ideas about how and why Analyn Cabras might discover when she searches for beetles in the Philippines.

### EXPLAIN

After reading, have students examine the definitions in the "**Know Your Scientist**" sidebar. Discuss how Analyn Cabras conducts her studies of beetles and how she incorporates each role into her work. **Ask:** *What does the word "mimic" mean?* (to imitate or look like something else) Have students reading the TRAILBLAZER edition discuss the difference between Müllerian and Batesian mimicry. **Ask:** *Why do some beetles mimic other beetles?* (Some beetles have colors that warn predators to stay away. Other beetles mimic them to stay safe.) *How does this behavior impact Cabras's work?* (The colors nearly fooled her, making it hard to identify new species.) Have students discuss the experiment Cabras conducted to see if a mimic's colors can fool predators, too. As a class, discuss what the results reveal about beetles.

### ELABORATE

Remind students that Cabras takes photos of beetles, their food plant and habitat when she is in the field. Have students turn and talk ask they discuss why she does this and how the information can help other scientists who study and work to protect beetles.

### EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare the results in small groups.

Name \_\_\_\_\_ Date \_\_\_\_\_

## CONTENT ASSESSMENT: WAITING TO BE DISCOVERED

Use information from the article to answer questions about Anallyn Cabras and her work with beetles.

What did she see?	What did she think?
How did she test her idea?	What did she discover?

How can her findings help others who study beetles?

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Nombre \_\_\_\_\_ Fecha \_\_\_\_\_

## EVALUACIÓN DE CONTENIDO: ESPERANDO A SER DESCUBIERTOS

Utiliza la información del artículo para responder las preguntas sobre Anallyn Cabras y su trabajo con los escarabajos.

¿Qué vio?	¿Qué pensó?
¿Cómo puso a prueba su teoría?	¿Qué descubrió?

¿Cómo pueden sus descubrimientos ayudar a otros investigadores de escarabajos?

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# SEEKING SOLUTIONS

## SCIENCE

### Standards Supported

- **NGSS Connections to Engineering, Technology, and Applications of Science: Influence of Science, Engineering and Technology on Society and the Natural World:**

Developing and using technology has impacts on the natural world. (2-ESS2-1)

- **NGSS Connections to Engineering, Technology, and Applications of Science: Influence of Engineering, Technology, and Science on Society and the Natural World:** Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts), and meet societal demands (e.g., cell phones.). (3-ESS3-1)

### What You Will Need

- Interactive Digital Magazine
- Content Assessment (English and Spanish) (pages 13–14)
- Article Test (English and Spanish) (pages 20–21)

### SCIENCE BACKGROUND

Agriculture provides the food we eat, but it is also a major source of water pollution. Fertilizer and animal manure from farms contain high amounts of nitrogen and phosphorous. When these nutrients seep into lakes and oceans, they create dead zones where little can survive.

National Geographic Explorer Marissa Cuevas Flores, has found a way to stem this pollution. She developed an on-farm system that upcycles wastewater so it can be reused. Microalgae in the system feed on the waste. Not only does this clean the water, but when the microalgae photosynthesizes it produces a protein that can be processed into food for fish.

### ENGAGE

Encourage students to review the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they know about water pollution.

### EXPLORE

Display the "**Seeking Solutions**" article with the interactive digital magazine. As a class, compose a list of ways water can become polluted. Invite students to describe instances of water pollution they have seen.

### EXPLAIN

After reading, invite students to share what they learned about wastewater and agriculture. **Ask:** *How is water run-off from farms harmful?* (It contains chemicals that pollute the water and cause dead zones, which are low-oxygen areas in rivers, lakes, and oceans where few things can live.) *How did Marissa Cuevas Flores solve this problem?* (She invented a system that upcycles wastewater and makes it reusable.) In small groups, have students discuss how the system works. (They give wastewater from fish farms to a special kind of microalgae. The microalgae cleans the water and makes a protein that they use to make food for fish.) As a class, discuss how the system protects Earth's resources and environment while also providing an economic benefit for the fish farmers who use it.

### ELABORATE

After reading, remind students there are two kinds of environmental scientists. In small groups, have students compare and contrast the two kinds of scientists and discuss how they can work together to find new ways to protect Earth's resources and environments.

### EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare the results in small groups.

**CONTENT ASSESSMENT: SEEKING SOLUTIONS**

Describe the problem and solution identified in the article.

Problem	Solution

Create a diagram that shows how the solution works.



Explain how the solution protects Earth's resources and environment.

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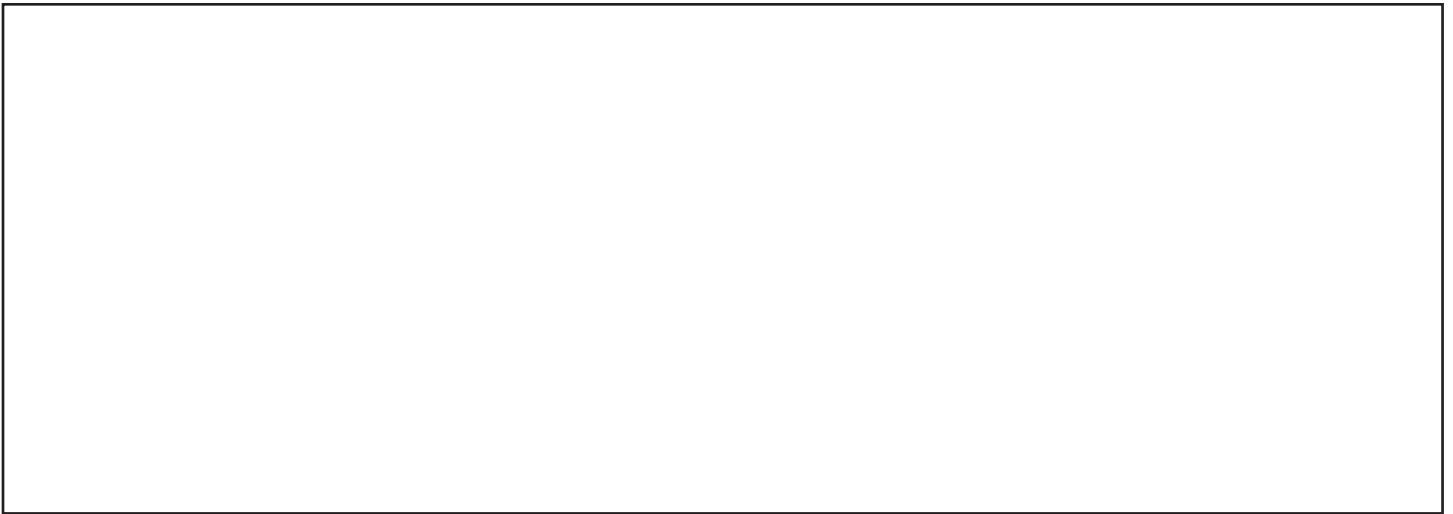
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## EVALUACIÓN DE CONTENIDO: EN BUSCA DE SOLUCIONES

Describe el problema y la solución mencionados en el artículo.

Problema	Solución

Haz un diagrama que explique cómo funciona la solución.



Explica cómo esa solución protege los recursos de la Tierra y el medio ambiente.

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# PROTECTOR OF THE AMAZON

## SOCIAL STUDIES

### Standards Supported

- **C3: Human-Environment Interaction: Place, Regions, and Culture:** Identify some cultural and environmental characteristics of specific places. (D2.Geo.6.K-2)
- **C3: Human-Environment Interaction: Place, Regions, and Culture:** Describe how environmental and cultural characteristics influence population distribution in specific places or regions. (D2.Geo.6-3-5)

### What You Will Need

- Interactive Digital Magazine
- Content Assessment (English and Spanish) (pages 16–17)
- Article Test (English and Spanish) (pages 22–23)

### SOCIAL STUDIES BACKGROUND

People of the Waorani nation, an indigenous group of about 5,000 people, have lived in the rainforests of Ecuador for generations. In 2019, led by their young leader Nemonte Nenquimo, the Waorani sued the government of Ecuador in an effort to protect their way of life.

The government wanted to auction off sections of the rainforest, including their territory, to oil companies for drilling. In 2012, government representatives had held short, rushed meetings to inform the Waorani about their intentions. However, many Waorani were unable to attend, the information wasn't presented in a way they could understand, and only positive aspects of the drilling were mentioned.

In a landmark decision, the judges ruled in the Waorani's favor. The verdict protected half a million acres of their rainforest territory. It also recognized that all indigenous people have rights over their territories that must be respected.

### ENGAGE

Encourage students to review the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they know about the Amazon rainforest.

### EXPLORE

Display the "**Protector of the Amazon**" article with the interactive digital magazine. As a class, read aloud the article's subheads. Then have students brainstorm ideas about why Nemonte Nenquimo needed to protect the Amazon and how she did it .

### EXPLAIN

After reading, remind students that the Waorani nation is a group of indigenous people who live in the Amazon rainforest. **Ask:** *Why is the rainforest so important to the Waorani?* (It's their home.) *What did the government of Ecuador want to do with their land?* (sell it land to oil companies) *How did the Waorani fight back?* (They sued the government.) In small groups, have students identify ways that the Waorani's lives are connected to the rainforest. Encourage them to discuss how the Waorani mapped their land and why that map was an important part of their case. As a class, brainstorm ideas about how the Waorani's victory in court was also a win for other indigenous people living in the Amazon rainforest.

### ELABORATE

Remind students that the Waorani nation went to court to protect its way of life. In small groups, have students conduct research to learn about another indigenous group who has had its culture threatened or destroyed by outsiders. Invite students share what they learn about the group, its culture, and its struggle with the class.

### EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare the results in small groups.

**CONTENT ASSESSMENT: PROTECTOR OF THE AMAZON**

Answer each question about the article.

Who are the Waorani?	
What is their culture like?	
Why did they have to fight for their culture and land?	
How did they fight for their culture and land?	
What happened? Why?	

Do you agree with the court's decision in this case? Why or why not?

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## EVALUACIÓN DE CONTENIDO: PROTECTORA DE LA AMAZONIA

Responde las preguntas sobre el artículo.

¿Quiénes son los huaorani?	
¿Cómo es su cultura?	
¿Por qué tuvieron que defender su cultura y su tierra?	
¿Cómo defendieron su cultura y su tierra?	
¿Qué ocurrió? ¿Por qué?	

¿Estás de acuerdo con la decisión del tribunal? ¿Por qué sí? ¿Por qué no?

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**ARTICLE TEST: WAITING TO BE DISCOVERED**

Read each question. Fill in the circle next to the correct answer and then write your response on the lines.

1. Which kind of scientist studies and collects beetles?

- Ⓐ biologist
- Ⓑ coleopterist
- Ⓒ ecologist

2. Where does Analyn Cabras study beetles?

- Ⓐ on an island
- Ⓑ in a desert
- Ⓒ in Antarctica

3. What do bright colors help some beetles do?

- Ⓐ find predators
- Ⓑ hide from predators
- Ⓒ warn predators to stay away

4. How do some beetles fool predators?

- Ⓐ They only live on certain plants.
- Ⓑ They mimic other beetles.
- Ⓒ They are jewel weevils.

5. Describe Analyn Cabras's experiment and tell what she learned.

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**PRUEBA DEL ARTÍCULO: ESPERANDO A SER DESCUBIERTOS**

Lee cada pregunta. Llena el círculo de cada opción correcta y responde a la última pregunta en los espacios en blanco.

1. **¿Qué científicos estudian y coleccionan escarabajos?**

- Ⓐ los biólogos
- Ⓑ los coleopterólogos
- Ⓒ los ecólogos

2. **¿Dónde estudia Analyn Cabras escarabajos?**

- Ⓐ en una isla
- Ⓑ en un desierto
- Ⓒ en la Antártida

3. **¿Para qué les sirven a los escarabajos sus vivos colores?**

- Ⓐ para encontrar predadores
- Ⓑ para esconderse de los predadores
- Ⓒ para advertir a los predadores de un peligro

4. **¿Cómo engañan algunos escarabajos a sus predadores?**

- Ⓐ Solo comen ciertas plantas.
- Ⓑ Imitan a otros escarabajos.
- Ⓒ Son gorgojos joya.

5. **Describe el experimento de Analyn Cabras y cuenta qué aprendió.**

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## ARTICLE TEST: SEEKING SOLUTIONS

Read each question. Fill in the circle next to the correct answer and then write your response on the lines.

1. What problem did Marissa Cuevas Flores want to solve?

- Ⓐ water pollution
- Ⓑ water run-off
- Ⓒ water habitats

2. What can cause dead zones?

- Ⓐ microalgae
- Ⓑ wastewater
- Ⓒ oxygen

3. What does upcycling do to wastewater?

- Ⓐ make it reusable
- Ⓑ turn it into oxygen
- Ⓒ add chemicals to it

4. What does microTERRA do?

- Ⓐ clean water and make food for fish
- Ⓑ clean microalgae and make fish
- Ⓒ clean proteins and make wastewater

5. How does microTERRA work?

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## PRUEBA DEL ARTÍCULO: EN BUSCA DE SOLUCIONES

Lee cada pregunta. Llena el círculo de cada opción correcta y responde a la última pregunta en los espacios en blanco.

1. **¿Qué problema quería resolver Marissa Cuevas Flores?**

- Ⓐ la contaminación del agua
- Ⓑ las escorrentías
- Ⓒ los hábitats acuáticos

2. **¿Qué causa las zonas muertas?**

- Ⓐ las microalgas
- Ⓑ las aguas residuales
- Ⓒ el oxígeno

3. **¿Qué hace el suprarreciclaje a las aguas residuales?**

- Ⓐ permite reutilizarlas
- Ⓑ las convierte en oxígeno
- Ⓒ les añade sustancias químicas

4. **¿Qué hace microTERRA?**

- Ⓐ reciclar agua y producir comida para peces
- Ⓑ limpiar microalgas y criar peces
- Ⓒ limpiar proteínas y generar aguas residuales

5. **¿Cómo funciona microTERRA?**

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## ARTICLE TEST: PROTECTOR OF THE AMAZON

Read each question. Fill in the circle next to the correct answer and then write your response on the lines.

1. Where do the Waorani people live?

- Ⓐ on a mountain in the Philippines
- Ⓑ on farms in Mexico
- Ⓒ in the rainforests of Ecuador

2. Who did the government want to sell their land to?

- Ⓐ oil companies
- Ⓑ loggers
- Ⓒ environmentalists

3. What did the map they made of their land show?

- Ⓐ where to find oil
- Ⓑ their strong relationship with the land
- Ⓒ where the big cities were located

4. What did the court's decision mean?

- Ⓐ Their land will be protected.
- Ⓑ The government can sell their land.
- Ⓒ The Waorani can sell their land themselves.

5. What are the three most interesting things you learned about the Waorani?

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## PRUEBA DEL ARTÍCULO: PROTECTORA DE LA AMAZONIA

Lee cada pregunta. Llena el círculo de cada opción correcta y responde a la última pregunta en los espacios en blanco.

- ¿Dónde viven los huaorani?**
  - Ⓐ en las montañas de Filipinas
  - Ⓑ en granjas de México
  - Ⓒ en la selva lluviosa de Ecuador
- ¿A quién quería vender el Gobierno de Ecuador las tierras de los huaorani?**
  - Ⓐ a compañías petroleras
  - Ⓑ a compañías madereras
  - Ⓒ a los ecologistas
- ¿Qué mostraba el mapa que hicieron los huaorani de sus tierras?**
  - Ⓐ dónde encontrar petróleo
  - Ⓑ su fuerte vínculo con la tierra
  - Ⓒ dónde estaban las grandes ciudades
- ¿Qué significó el veredicto del juez para los huaorani?**
  - Ⓐ que sus tierras serían protegidas
  - Ⓑ que el Gobierno podría vender sus tierras
  - Ⓒ que los huaorani podrían vender sus tierras

5. Menciona las tres cosas más interesantes que has aprendido de los huaorani.

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# PIONEER AND TRAILBLAZER

## ANSWER KEY

### WAITING TO BE DISCOVERED

**Content:** pages 10–11

**See:** She saw beetles that were mimicking the colors of other beetles.

**Think:** She thought the mimics' colors might fool predators, just as they had almost fooled her into thinking they were a different, more dangerous species.

**Test:** She made fake beetles with warning colors out of clay. She placed them in places predators were familiar with the real beetles and places where they weren't.

**Discover:** If the predator knew the warning colors, it did not attack. But, if the predator did not know the warning colors, it did. These predators had not yet learned to stay away.

**Question:** Her findings can help other scientists better understand the beetles and keep scientists from being fooled by beetles that mimic the colors of other species.

**Article Test:** page 18–19

1. B ; 2. A ; 3. C ; 4. B ; 5. She made fake beetles out of clay. She gave them warning colors. She put them on plants to see if predators would attack. She learned that if predators knew the warning colors, they did not attack. If they didn't know the colors, they did. They hadn't yet learned to stay away.

### SEEKING SOLUTIONS

**Content:** page 13–14

**Problem:** Many farms use chemicals to cut down on weeds and pests. Water run-off from these farms can cause pollution. This waste wastewater can cause dead zones.

**Solution:** Marissa Cuevas Flores found a way to upcycle the wastewater and make it reusable. It uses microalgae to clean polluted water in fish farms.

**Diagram:** Students' diagrams should resemble the "microTERRA Circular Economy" diagram in the article.

**Question:** The process turns polluted water into clean water. It also provides a cheaper source of fish food for fish farmers.

**Article Test:** page 20–21

1. A ; 2. B ; 3. A ; 4. A ; 5. They take fish farm wastewater and give it to a special kind of microalgae. This cleans the water so it can be reused. Through photosynthesis, the microalgae makes a protein that they use to make food for fish.

### PROTECTOR OF THE AMAZON

**Content:** page 16–17

1. The Waorani are group of indigenous people who live in the Amazon rainforest.
2. Possible response: They are hunter-gatherers whose lives are connected to the rainforest. They do not have much contact with the outside world.
3. The government wanted to sell their land to oil companies.
4. They filed a lawsuit to stop the government from selling their land.
5. They won. The Waorani showed the judges a map they had made of their land. They told them about their rainforest home. One judge said the government had not tried to understand the Waorani or their culture. The Waorani wanted to keep their land, so the government could not sell it.
6. Answers will vary.

**Article Test:** page 22–23

1. C ; 2. A ; 3. B ; 4. A ; 5. Answers will vary.



# PIONEER Y TRAILBLAZER

## CLAVES DE RESPUESTA

### ESPERANDO A SER DESCUBIERTOS

**Contenido:** páginas 11 y 12

**Ver:** Vio escarabajos que imitaban los colores de otras especies.

**Pensar:** Pensó que los colores de las especies miméticas podrían engañar a los predadores, así como la habían engañado a ella para que creyera que eran especies diferentes y más peligrosas.

**Demostrar:** Hizo escarabajos falsos de arcilla con colores de advertencia. Los colocó en lugares donde los predadores estaban familiarizados con escarabajos reales y en lugares donde no lo estaban.

**Descubrir:** Si el predador conocía los colores de advertencia, no atacaría. Pero si el predador no los reconocía, sí lo haría. Estos últimos no habían aprendido todavía a mantenerse alejados.

**Pregunta:** Sus descubrimientos pueden ayudar a otros científicos a comprender mejor a los escarabajos y evitar que sean engañados por aquellas especies que imitan los colores de otras.

**Prueba del artículo:** páginas 19 y 20

1.B; 2. A; 3.C; 4.B; 5. Hizo escarabajos falsos de arcilla. Aprendió que si los predadores reconocían los colores de advertencia, no atacaban. Y si no los reconocían, sí lo hacían. Estos predadores no habían aprendido todavía a mantenerse alejados

### BUSCANDO SOLUCIONES

**Contenido:** páginas 14 y 15

**Problema:** Muchas granjas utilizan productos químicos para eliminar las malas hierbas y los parásitos. Las escorrentías de las granjas causan la contaminación, y las aguas residuales causan las zonas muertas.

**Solución:** Marissa Cuevas Flores encontró una manera de suprarreciclar las aguas residuales y reutilizarlas. Usa microalgas para limpiar el agua contaminada de las piscifactorías.

**Diagrama:** Los diagramas de los estudiantes deben parecerse al diagrama “Economía circular de microTERRA” del artículo.

**Pregunta:** El proceso convierte el agua contaminada en agua limpia. Además, proporciona una fuente más barata de alimento para los acuicultores.

**Prueba del artículo:** páginas 21 y 22

1. A; 2.B; 3. A; 4. A; 5. Toman las aguas residuales de las piscifactorías y las tratan con un tipo especial de microalgas. Así limpian el agua para poder reutilizarla. A través de la fotosíntesis, las microalgas producen una proteína que sirve de comida para los peces.

### PROTECTORA DE LA AMAZONIA

**Contenido:** páginas 17 y 18

1. Los huaorani son un grupo de indígenas que viven en la selva lluviosa amazónica.
2. Respuesta posible: Son cazadores-recolectores íntimamente relacionados con la selva donde viven. Apenas tienen contacto con el mundo exterior.
3. El Gobierno quería vender sus tierras a las compañías petroleras.
4. Presentaron una demanda para detener la venta del Gobierno de sus tierras.
5. Los huaorani ganaron el juicio. Mostraron a los jueces un mapa que hicieron de su tierra. Les dijeron que la selva era su hogar. Uno de los jueces dijo que el Gobierno no había intentado comprender a los huaorani ni a su cultura. Los huaorani querían conservar sus tierras, por lo que el Gobierno no pudo venderlas.
6. Las respuestas variarán.

**Prueba del artículo:** páginas 23 y 24

1. C; 2. A; 3. B; 4. A; 5. Las respuestas variarán.