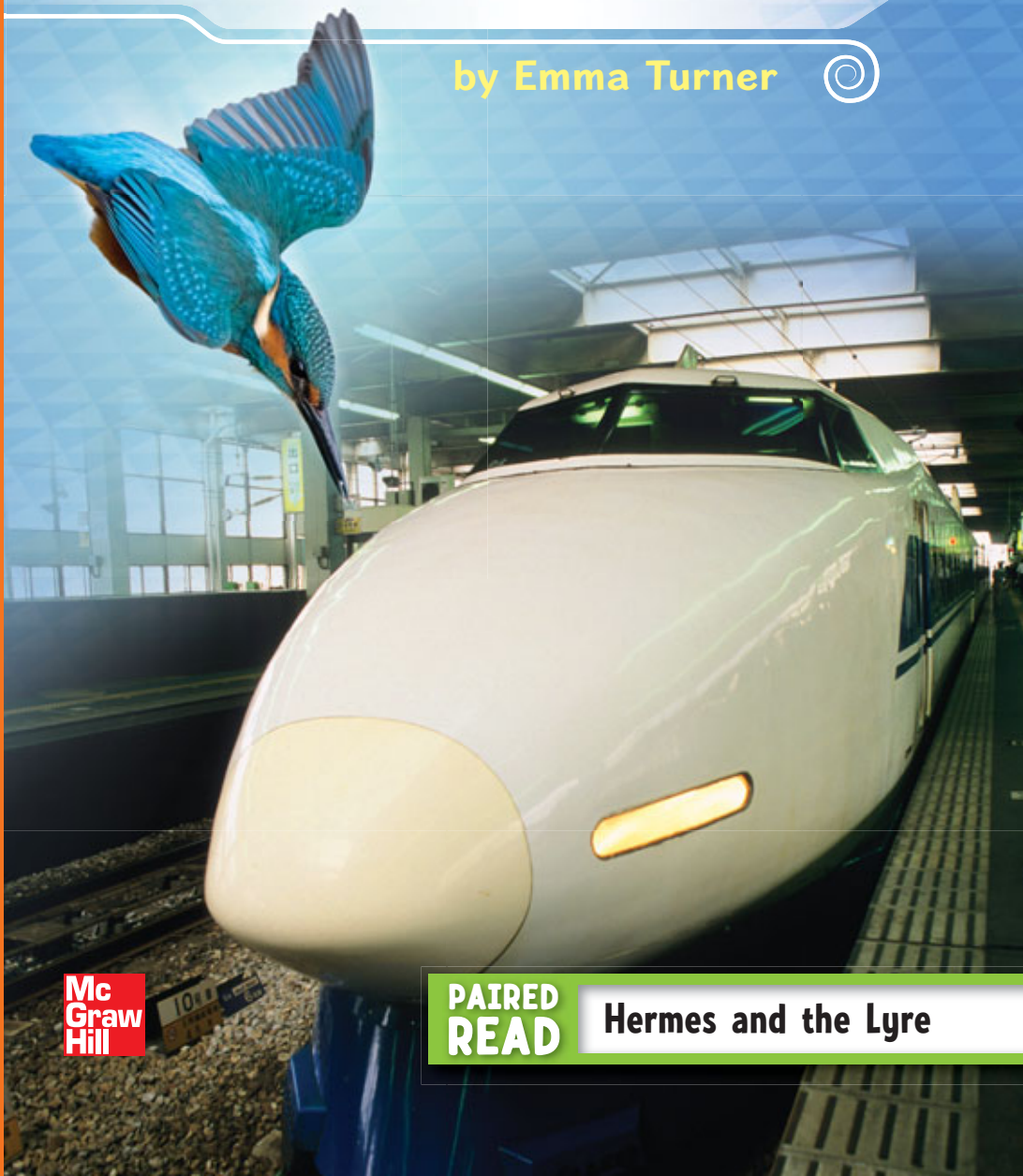
Expository Text

Inspired by Nature

by Emma Turner



PAIRED READ

Hermes and the Lyre

Mc Graw Hill

STRATEGIES & SKILLS

Comprehension

Strategy: Summarize

Skill: Main Idea and Key Details

Vocabulary

effective, example, identical, imitate, material, models, observe, similar

Vocabulary Strategy

Root Words

Content Standards

Science

Technology

Word count: 904**

Photography Credit: Cover (tl) Andrew Howe/Vetta/Getty Images, (br) Irene Alastruey/Punchstock.

**The total word count is based on words in the running text and headings only. Numerals and words in captions, labels, diagrams, charts, and sidebars are not included.

CCSS **Genre** Expository Text

Essential Question

What ideas can we get from nature?

Inspired by Nature

by Emma Turner

Introduction

Lotus plants can live in muddy ponds. Yet their leaves are always clean and dry. A lotus leaf has many tiny grooves. These grooves trap air bubbles. The air bubbles stop dirt and water settling on the leaf. The dirty water drops slide off instead.

The leaves of the lotus plant do not get dirty.

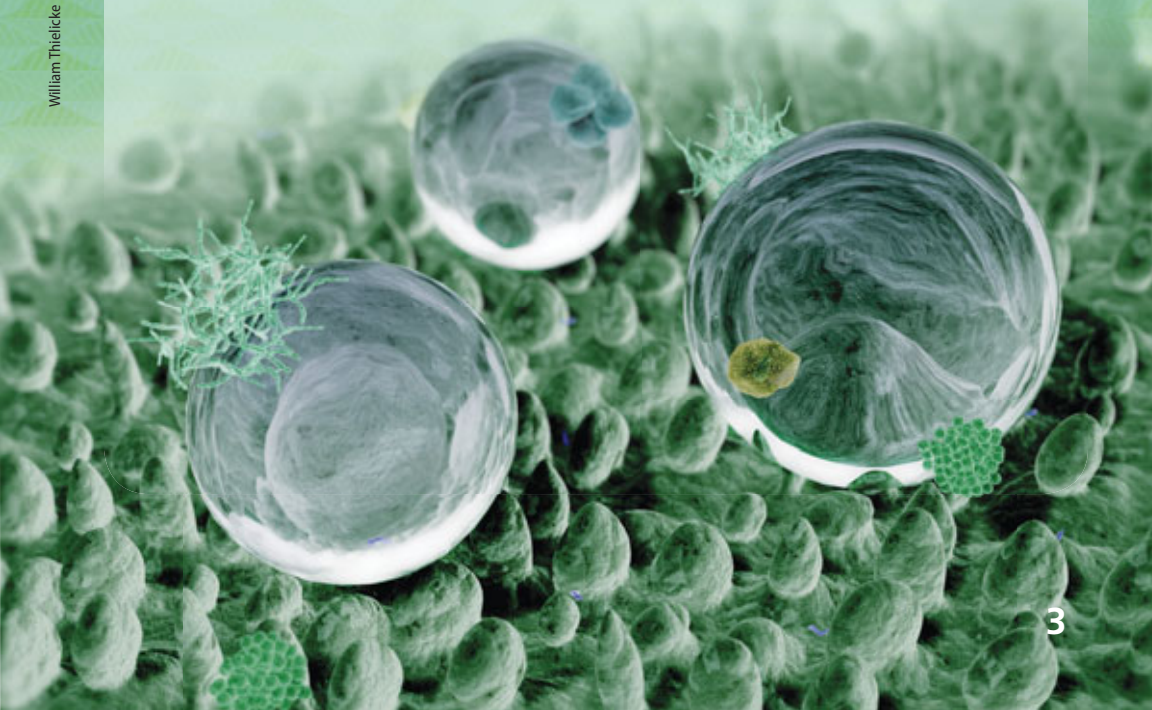
AID/amanaimages/CORBIS

Nature is full of good ideas. Plants and animals have some very clever design features. Now, scientists are studying these models. They are making new **products** that copy what they see in nature. Scientists have made paints that imitate the lotus leaf. These paints clean themselves!

STOP AND CHECK

Why do people use ideas from nature?

These bumps and grooves help keep the leaf clean.



William Thielicke

Chapter 1 Getting Around

Copying what we see in nature can improve how we travel. Japan's first super-fast trains had a noisy problem. Each time a train went through a tunnel, it made a loud boom.

Kingfisher birds hardly make a splash when they dive into water. **Engineers** changed the front of the trains. They matched the shape of the kingfisher. The loud booms stopped. The problem was solved!

(t) Andrew Howe/Vetta/Getty Images, (b) Irene Alastruey/Punchstock

A kingfisher's head and the front of this train match!

This shark has special scales that help it swim faster.

People look underwater for ideas, too. Sharks have skin covered in special scales. These scales help sharks to "slide" quickly through water.

People have copied sharks' skin to make swimsuits. Aircraft builders made a coating for the wings of airplanes. It copied sharks' skin, too. Now the swimmers and the airplanes travel faster.

Carmakers study insects to get new ideas. One example is the bee. Bees can see objects all around them. So it is easy to avoid hitting things. Locusts could be useful, too. They can fly in large groups. But they never hit each other. Carmakers want to build cars with similar features.

STOP AND CHECK

What animal inspired new swimsuits?

This bee has a very wide field of vision.

sodapix sodapix/F1online RF/Getty Images

Scientists studied dolphins to solve a big problem. **Tsunami** are very big waves. People need to be warned if a tsunami is coming. So scientists try to track them. Devices on the sea floor collect information. The information goes to the surface as sounds. But on the way, the sounds can get muddled. The information can be lost.

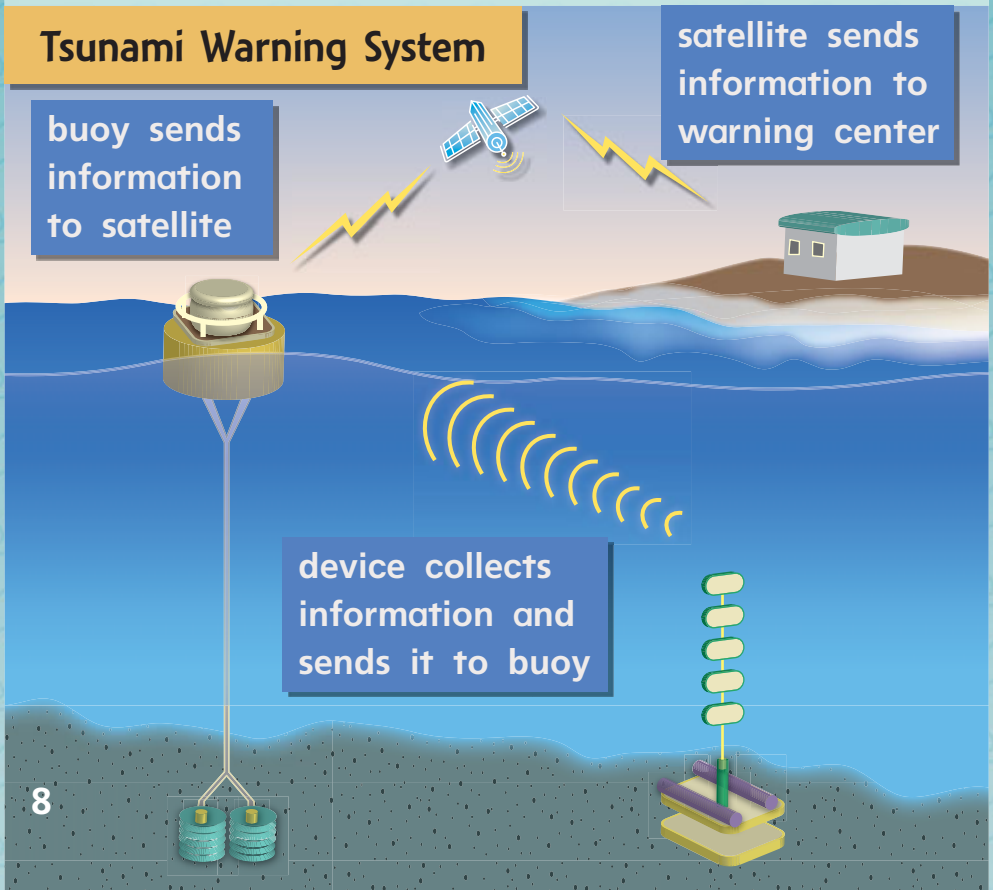
In 2004, a tsunami in the Indian Ocean hit this village in Asia.

dpa/CORBIS

Dolphins send clear messages in water.

(t) Marty Snyderman/CORBIS

Scientists looked at the way dolphins "talk." Dolphins have a clever way to send messages through water. Their system is better than some of our systems. Now, experts have copied the way dolphins send messages. This will help them track tsunami waves.



Did you know that blue jays' feathers aren't really blue? They just appear to be blue. A Morpho butterfly's wings are the same. Cell phone screens can look dull in bright light. A company is making a cell phone based on the butterfly's wings. Colors on the screen will look bright in full sunlight!

STOP AND CHECK

What problem did scientists solve by studying dolphins?

The special pattern on a Morpho butterfly's wings makes it look bright blue.

The sandcastle worm makes glue that works underwater. Today, doctors use pins and screws to fix broken bones. But in some cases, glue would work better. Scientists have created glue based on the sandcastle worm's glue. The new glue is safe and effective. It dries almost anywhere. It could be a better way to fix broken bones!

Russell Stewart/the University of Utah

The sandcastle worm builds its home with a special glue.

A gecko's toes are covered with thousands of tiny hairs.

The idea for one robot comes from the gecko. A gecko's foot has many tiny hairs. Each hair splits into many more hairs. The hairs are attracted to any surface. That is why geckos can climb walls and walk across ceilings!

Scientists have built a robot called Stickybot. Its feet are like the gecko's feet. They can grip any surface. Stickybot can climb walls. It can walk up glass and metal. In the future, people could wear Stickybot material to climb skyscrapers or crawl under bridges.

Stickybot can climb walls, like a gecko.

Mark R. Cutkosky/Standford

This robot can't go everywhere on Mars.

NASA wants new ways to explore Mars. Mars is a dry, windy planet. Tumbleweeds grow in dry, windy places. Scientists studied the tumbleweed plant. They made plans for a new robot. It will be round like a tumbleweed. Like the plant, it will travel long distances in the wind.

STOP AND CHECK

Why are tumbleweeds a good model for a Mars robot?

Scientists may build a new robot inspired by this plant.

Conclusion

Nature's **designs** are built to last. The products people make using ideas from nature are not identical to the originals. But when we observe plants and animals, we can find wonderful ways to improve our lives. What ideas from nature will people borrow next? The possibilities are endless!

The bat inspired this small robot spy plane.

Eric Maslowski/the University of Michigan

Respond to Reading

Summarize

Summarize the ideas and new products in this book. Use the chart to help you.

Main Idea
Detail
Detail
Detail

Text Evidence

1. How do you know this is expository text? Genre
2. Write the main idea and two details from page 12. Main Idea and Key Details
3. What is the root word of *information* on page 7? What does *information* mean? Root Words
4. Write about the most interesting product in this book. Include two details. Write About Reading

CCSS **Genre Myth**

Compare Texts

Read about how a young Greek god uses items from nature to make a new musical instrument.

Hermes and the Lyre

Hermes was a son of the god Zeus. On the day he was born, Hermes left his cradle and went looking for mischief. Outside, he saw his brother Apollo's cows. He decided to steal them. Hermes wove sandals out of twigs to disguise his tracks. To add to the confusion, he drove the cows backward.

Illustration: Gaia Bordicchia

On the way, he passed an old man in a vineyard. Hermes promised the old man a good harvest if he told no one what he saw.

Hermes drove the cows to a cave. In the cave, he found a dead tortoise. He had an idea. He wanted to make a musical instrument. Hermes used the tortoise shell to make a frame. He added reeds, cowhide, and sheep gut. That was how Hermes invented the lyre. He tuned it and began to sing.

Meanwhile, Apollo could not find his cows. He asked the old man about them. The old man admitted that he had seen a child driving a herd of cattle backward. Apollo guessed that it was Hermes. Apollo asked Hermes. But Hermes pretended to be a baby. So Apollo asked Zeus for help.

Zeus ordered Hermes to give back the cows. But Hermes began playing his lyre instead. When Apollo heard the beautiful music, he agreed to a deal. Hermes kept the cows, but gave the lyre to Apollo. And Hermes promised never to steal from his brother again.

Illustration: Gaia Bordicchia

Make Connections

How did what Hermes saw in nature lead to a new idea? **Essential Question**

Why is learning about nature helpful? Use examples from the text in your answer. **Text to Text**

Glossary

designs *(di-ZIGHNZ)* plans and instructions for how to build something ***(page 14)***

engineers *(en-juh-NIRZ)* people who build engines and other machines ***(page 4)***

products *(PRAH-duhkts)* items made for sale and profit ***(page 3)***

tsunami *(su-NAH-mee)* a huge wave caused by underwater earthquakes or eruptions ***(page 7)***

Index

Focus on Science

Purpose To think up an idea for a new product.

What to Do

Step 1 Choose a cool plant or animal.

Step 2 Find out as much as you can about the plant or animal.

Step 3 Make a list of some features that help the plant or animal.

Step 4 Use one feature to think up an idea for a new product. Write a short paragraph about the new product. How will it be useful?

Conclusion What did you learn about the plant or animal? Share your findings with your classmates.

Literature Circles

Nonfiction

Thinkmark

The Topic

What is *Inspired by Nature* mostly about?

Vocabulary

What new words did you learn? How did you figure out the meanings?

Conclusions

What are the most important things you learned from this book?

Author's Purpose

Why do you think the author wrote *Inspired by Nature*?