

Copycat: Nature-Inspired Design Around the World written and illustrated by Christy Hale

About the Book

Genre: Nonfiction Poetry

Format: Hardcover, 32 pages

ISBN: 9781643792309

Reading Level: Grade 3

Interest Level: Grades PreK–6

Guided Reading Level: P

Accelerated Reader® Level/Points:
N/A

Lexile™ Measure: NP

*Reading level based on the ATOS Readability Formula

Themes: Animals, Environment/
Nature, Imagination, Informational Text,
Inventors/Inventions, Nature/Science,
Design, Nonfiction, Poetry

Resources on the web:

leeandlow.com/books/copycat

SYNOPSIS

Illustrations of plants and animals and tanka poetry are paired with photographs of innovative inventions and designs found around the world to present captivating examples of nature-inspired design. A lotus leaf inspires the invention of the umbrella. A cat's eyes inspire the development of safety road reflectors. Discover how mimicking behaviors and strategies in nature lead inventors and designers to develop amazing new products, processes, and technologies that improve our lives and environment.

In this companion to her award-winning book *Dreaming Up: A Celebration of Building*, Christy Hale has crafted an extraordinary collection that introduces readers to the surprising ways in which nature has sparked human creativity and innovation.

Come be inspired to explore--discover--create!

All guided reading level placements may vary and are subject to revision. Teachers may adjust the assigned levels in accordance with their own evaluations.

BACKGROUND

Nature-Inspired Design and Biomimicry from the Backmatter

The pairings of illustrations and photographs in this book all show examples of nature-inspired design. Nature-inspired design occurs when people solve problems based on what they observe happening in nature, or when plant or animal behaviors or characteristics inspire new human inventions. Most of the pairings are also examples of biomimicry. The word biomimicry comes from two Greek words: *bios*, which means "life," and *mimesis*, which means "imitate." The Biomimicry Institute describes biomimicry as "a practice that learns from and mimics the strategies found in nature to solve human design challenges."

There are several myths and legends that reflect early examples of biomimicry. In one Greek myth, Daedalus, an inventor and a craftsman, created wings, like those of a bird, from feathers bound together with wax. He strapped the wings to himself and his son, Icarus, so they could fly away and escape the island of Crete. Unfortunately, Icarus flew too close to the sun. The sun's heat melted the wax, destroying the wings, and Icarus fell into the sea.

Leonardo da Vinci (1452–1519), painter, scientist, inventor, and more, studied the flight of birds and bats. He sketched their body structures and then drew plans for flying machines that would enable humans to fly. He said, "Go take your lessons in nature, that's where our future is." Although none of da Vinci's machines succeeded, his ideas inspired the Wright brothers, who did create a successful flying machine.

Nature is a constant innovator, adapting and refining designs and processes to survive and thrive on our planet for 3.8 billion years. Any failures eventually changed or no longer exist. People today can learn from the natural world and become "copycats." Plant, animal, and natural patterns, designs, behaviors, and characteristics can provide inspiration to innovate. The goal is to create sustainable new products, processes, systems, and technologies that solve our greatest design challenges and create new ways of living in harmony with all life on Earth.

"Biomimicry is . . . the conscious emulation of life's genius." –Janine Benyus, cofounder, Biomimicry Institute

Tanka

The poems throughout this book are written in a form called tanka. Japanese poets developed this form over hundreds of years. The word tanka means "short song" or "short poem." Tanka developed from waka, poetry written by members of the Japanese court in the sixth century. By the late-eighth century, tanka became a synonym for waka. The poems originally were chanted aloud, and the subject matter ranged from nature to love. Today, tanka are written about any subject. Each tanka is a self-contained story.

Tanka is a poetry form with rules. In Japanese, tanka have thirty-one speech sounds, or syllables. Also in Japanese, a tanka is often written in one continuous line without any punctuation. In English, the tanka form is different. Tanka still have thirty-one syllables, but these syllables are

written in five-line poems. Each of the five lines has a required number of syllables. The first line has five syllables, the second line has seven syllables, the third line has five syllables, and the last two lines have seven syllables each. The structure of lines and the syllable counts are as follows:

Line 1: five syllables

Line 2: seven syllables

Line 3: five syllables

Line 4: seven syllables

Line 5: seven syllables

Tanka usually do not have titles and do not rhyme. There is no capitalization at the beginning and no period at the end. Throughout there is very little or no punctuation. In this book's tanka, the third line of each poem has a special purpose. It serves as a turning point or bridge and is called a pivot. The content of the pivot relates to both the first two lines and the last two lines. The pivot line thereby joins or links the first two lines to the last two lines to tell a complete story.

Since the theme of this book is nature-inspired design, the tanka focus on nature and design. The first two lines of each poem describe a behavior or strategy in nature, and the last two lines highlight the human response of innovative design or invention. The third line, the pivot, links them.

Nature and Inventions Featured in *Copycat: Nature-Inspired Design Around the World*

Additional detailed information is available in the Back Matter of the book about each element of nature and invention featured in *Copycat: Nature-Inspired Design Around the World*.

Bibliography

For an entire list of sources used for each spread in *Copycat: Nature-Inspired Design Around the World*, consult the "Sources" spread at the end of the book.

Additional Activities and Resources from Christy Hale

Check out fun activities and downloadable resources developed by author/illustrator Christy Hale to accompany your reading of *Copycat: Nature-Inspired Design Around the World* and display around your classroom (<https://www.christyhale.com/copycat-1>).

BEFORE READING

Prereading Focus Questions

(Reading Standards, Craft & Structure, Strand 5 and Integration of Knowledge & Ideas, Strand 7)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1 and 2)

Before introducing this book to students, you may wish to develop background knowledge and promote anticipation by posing questions such as the following:

- Think about some of your favorite animals. Why do you like them? What kinds of physical features do they have? How do they adapt to their environments?
- What do you know about how animals adapt to their environments? How do animals blend into their environments to protect themselves from predators? What do you know about animals that have specific functionality that helps them survive in their habitats?
- How can we use nature and the environment around us as inspiration? What do you like to do in nature? What do you appreciate about nature and your environment?
- What do you know about poetry? What kinds of poetry do you like? What are the typical features of your favorite kind of poetry? Why do you think some authors like to write poetry? How do you feel about reading and writing poetry?

Exploring the Book

(Reading Standards, Key Ideas & Details, Strand 1; Craft & Structure, Strand 5; and Integration of Knowledge & Ideas, Strand 7)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1 and 2)

- **Book Title Exploration:** Talk about the title of the book: *Copycat: Nature-Inspired Design Around the World*. Ask students what they think this book will most likely be about and whom the book might be about. What do they think might happen? What information do they think they might learn? What makes them think that?
- **Read Christy Hale's Biography:** Read about author/illustrator Christy Hale on the jacket back flap as well as on her website (<https://www.christyhale.com/>). How or where do you think Christy Hale finds inspiration for her books?
- Encourage students to stop and jot in their reading notebooks during the read-aloud when they: learn new information, see a powerful image, have an emotional reaction or an idea, have a question, or hear new words.
- Have students quickly write a feeling in their notebooks during reading. After reading, ask students why they wrote down that feeling and have them write a journal entry about it.

Setting a Purpose for Reading

(Reading Standards, Key Ideas & Details, Strands 1–3)

Have students read to find out:

- how the title fits the theme of the story.
- the kinds of plants and animals featured in the story and how they connect to designs of different objects in the world around us.

- what biomimicry means and how it influences our environment.
- the beauty and wonder of the natural world and how unique plants, animals, and other objects inspire modern innovation around us.
- how we can use nature to inspire sustainability now and in the future.

Encourage students to consider why author/illustrator Christy Hale would want to share this book featuring nature-inspired design and biomimicry with young people.

VOCABULARY

(Reading Standards, Craft & Structure, Strand 4)

(Language Standards, Vocabulary Acquisition & Use, Strands 4–6)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1 and 2)

The story contains several content-specific and academic words and phrases that may be unfamiliar to students. Based on students' prior knowledge, review some or all of the vocabulary below.

Encourage a variety of strategies to support students' vocabulary acquisition: look up and record word definitions from a dictionary, write the meaning of the word or phrase in their own words, draw a picture of the meaning of the word, create a specific action for each word, list synonyms and antonyms, and write a meaningful sentence that demonstrates the definition of the word.

Content Specific

lotus, dragonfly, whirlybird, baobab, beetle, kingfisher, self-cooling, hummingbird, wind converter, termite, architects, burrs, armadillo, scales, corals, particles, smog, suction cups, tentacle, icicle, cavern, stalactites, stalagmites, honeycomb bee, cells

Academic

waxy, repels, agile, darts, glides, hovers, maneuvers, scarce, funnel, colossal, streamlined, prickly, efficiently, tapered, compact, space-saving, modular, beams, dim

AFTER READING

Discussion Questions

After students have read the book, use these or similar questions to generate discussion, enhance comprehension, and develop appreciation for the content. Encourage students to refer to passages and/or illustrations in the book to support their responses. **To build skills in close reading of a text, students should cite textual evidence with their answers.**

Literal Comprehension

(Reading Standards, Key Ideas & Details, Strands 1–3)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1–3 and Presentation of Knowledge & Ideas, Strand 4)

For each poem, ask students:

1. How does the language and context of the poem help you figure out how the innovation was inspired by nature? What visual clues does the author/illustrator give to demonstrate how

nature inspired this particular design?

2. What object from nature is featured in the poem and what is the innovation? How can you tell that the object from nature inspired the innovation?
3. What features from the object in nature can you observe in the innovation?
4. What kinds of descriptive words are used in the poem? How does the author/illustrator describe the object from nature? What about the innovation?

Extension/Higher Level Thinking

(Reading Standards, Key Ideas & Details, Strands 2 and 3 and Craft & Structure, Strands 4 and 6)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1–3 and Presentation of Knowledge & Ideas, Strand 4)

1. What does the title *Copycat: Nature-Inspired Design Around the World* mean to you after reading the book? Why do you think the author/illustrator chose this particular title?
2. How is this book different from other books of poetry you've read? What makes it stand out?
3. How are all the poems in the book similar? What are some elements that the poems share? What makes you think that? What evidence can you provide to prove their similarities?
4. How are the poems different from one another? What are some elements that vary from poem to poem? What makes you think that? What evidence can you provide to prove their differences?
5. Did you read the section at the end of the book about tanka? The poems in this book are written in tanka. What makes tanka poetry special? What are the two parts of tanka poetry? How do they work together to tell a story? How did the tanka structure help you understand the connection between the natural object and the innovation?
6. What kinds of themes do you see throughout the poems? Why do you think Christy Hale, the author/illustrator, decided to include these themes in the poems?
7. Which poems did you connect with the most? How did you feel about them? Why?
8. How can you use the illustrations to help make sense of the poems and their information? How do the illustrations convey the design inspiration from the illustration to the photograph?
9. Why do you think the author/illustrator uses specific figurative language in the poems? What figurative language do you find throughout the poems?
10. Why is it important to explore your community and be outdoors? How does nature and your neighborhood inspire you?
11. Why do you think both illustrations and photographs accompanied the poems? How did that affect your reading of the book? How was it helpful as a reader?
12. How does each innovation help improve the quality of life for people as a whole? How does this innovation, inspired by nature, help people in their daily lives?
13. Did you think of any innovations or creations in the world that were inspired by plants, animals, and other objects in nature? What are they? Why do you think it's important for us to

use inspiration from the natural world around us?

- 14.** What can nature teach us? What did you learn from *Copycat: Nature-Inspired Design Around the World* about how nature can help to inform how we live now and in the future?

Reader's Response

(Writing Standards, Text Types & Purposes, Strands 1–3 and Production & Distribution of Writing, Strands 4–6)

Use the following questions and writing activities to help students practice active reading and personalize their responses to the book. Suggest that students respond in reader's response journals, essays, or oral discussion. You may also want to set aside time for students to share and discuss their written work.

- 1.** What is one big thought you have after reading this book? Think about what you learned about nature-inspired design and biomimicry and how different elements in nature have inspired objects that we use and interact with today. What is your takeaway from this book? What would you tell a friend about this book?
- 2.** What do you think is Christy Hale's message to the reader? Think about possible motivations behind Christy Hale's creating this book. What do you think she intended to tell her readers?
- 3.** Have students make a text-to-self connection. What kinds of connections did you make from this book to your own life?
- 4.** Have students make a text-to-text connection. Did you think of any other books while you read *Copycat: Nature-Inspired Design Around the World*? Why did you make those connections?
- 5.** Have students make a text-to-world connection. What kind of connections did you make between this book and what you have seen in the world, such as online, on television, or in a newspaper? Why did this book cause you to make those connections?
- 6.** What does nature-inspired design mean to students after reading? After reading *Copycat: Nature-Inspired Design Around the World*, do students think differently about the objects they use regularly in their lives? How were the designs of these objects inspired by what can be found in the environment?
- 7.** What does poetry mean to students after reading? After reading *Copycat: Nature-Inspired Design Around the World*, do you think differently about poetry? How has the poetry in this book changed the way you might approach poetry in the future?

ELL Teaching Activities

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1–3 and Presentation of Knowledge & Ideas, Strands 4–6)

(Language Standards, Vocabulary Acquisition & Use, Strands 4–6)

These strategies might be helpful to use with students who are English Language Learners.

- 1.** Assign ELL students to partner-read the story with strong English readers/speakers. Students can alternate reading between pages, repeat passages after one another, or listen to the more fluent reader.
- 2.** Have each student write three questions about the story. Then let students pair up and discuss the answers to the questions.

3. Depending on students' level of English proficiency, after the first reading:
 - Review the illustrations in order and have students summarize what is happening on each page, first orally, then in writing.
 - Have students work in pairs to tell what they learned about one of the poems. Then ask students to write a short summary, synopsis, or opinion about what they have read.
4. Have students give a short talk about they learned about what nature means to them and what we can learn from the natural environment and animals around us.
5. The book contains several content-specific and academic words that may be unfamiliar to students, and several words are printed in bold. Based on students' prior knowledge, review some or all of the vocabulary. Expose English Language Learners to multiple vocabulary strategies. Have students make predictions about word meanings, look up and record word definitions from a dictionary, write the meaning of the word or phrase in their own words, draw a picture of the meaning of the word, list synonyms and antonyms, create an action for each word, and write a meaningful sentence that demonstrates the definition of the word.

Social and Emotional Learning

(Reading Standards, Key Ideas & Details, Strands 1-3 and Craft & Structure, Strands 4-6)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1-3 and Presentation of Knowledge & Ideas, Strand 4)

(Writing Standards, Text Types & Purposes, Strands 1-2 and Production & Distribution of Writing, Strands 4-6)

(Language Standards, Vocabulary Acquisition & Use, Strands 6)

Social and emotional learning involves being aware of and regulating emotions for healthy development. In addition to understanding one's own feelings, strong socio-emotional development allows individuals to develop empathy for others and to establish and maintain relationships.

Use the following prompts to help students study the socio-emotional aspects of this book.

1. What can nature-inspired design/biomimicry teach us about problem solving? What did you learn from the book about how you can use objects around you to solve a problem? Give an example from the book about how mimicking nature solved a problem or a common issue.
2. How does being in nature make you feel? What do you like about being in the outdoors? What do you observe when you go outside? How do you think nature can be helpful to other people?
3. Analyze the Albert Einstein quote from the backmatter: "Look deep into nature, and then you will understand everything better." What do you think he means by this? How does it connect to the themes in *Copycat: Nature-Inspired Design Around the World*? How does this quote apply to your own life?

INTERDISCIPLINARY ACTIVITIES

(Introduction to the Standards, page 7: Students who are college and career ready must be able to build strong content knowledge, value evidence, and use technology and digital media strategically and capably)

Use some of the following activities to help students integrate their reading experiences with other curriculum areas. These can also be used for extension activities, for advanced readers, and for building a home-school connection.

English/Language Arts

(Reading Standards, Key Ideas and Details, Strands 1–3, Craft and Structure, Strands 4–6, Integration of Knowledge & Ideas, Strands 7–9, Range of Reading of Text Complexity, Strand 10)

(Writing Standards, Text Types & Purposes, Strands 1–3, Production & Distribution of Writing, Strands 4 and 6, Research to Build & Present Knowledge, Strands 7–9, Range of Writing, Strand 10)

(Speaking and Listening Standards, Comprehension and Collaboration, Strands 1–3, Presentation of Knowledge and Ideas, Strands 4–6)

- **Examine and write nonfiction poetry.** Explore the use of nonfiction poetry to write about nature and our environment using some of the following Lee & Low titles: *Dreaming Up: A Celebration of Building* (<https://www.leeandlow.com/books/dreaming-up>), *Olinguito! From A to Z! Unveiling the Cloud Forest* (<https://www.leeandlow.com/books/olinguito-de-la-a-la-z-descubriendo-el-bosque-nublado-olinguito-from-a-to-z-unveiling-the-cloud-forest>), *A Full Moon is Rising* (<https://www.leeandlow.com/books/a-full-moon-is-rising>), *The Mangrove Tree: Planting Trees to Feed Families* (<https://www.leeandlow.com/books/the-mangrove-tree>), *Yum! ¡Mmmm! ¡Qué rico! Americas' Sproutings* (<https://www.leeandlow.com/books/yum-mmmm-que-rico-americas-sproutings>), and *Amazing Places* (<https://www.leeandlow.com/books/amazing-places>).
- **Have students write their own nonfiction poems, using nature as inspiration.** Bring objects from nature into the classroom, or if possible, have students bring their notebooks into a space outside the classroom. Students can observe an object in nature and write a poem about it, using the following questions: What do students see? What details do they observe in this particular object in nature? What does it smell like? What does it sound like? What colors do they see? How does it move? Consult the University of Arizona's Poetry Center for additional ideas and lesson plans on a variety of genres within poetry (<https://poetry.arizona.edu/education/k-12-youth/curriculum>). Students may share their poems with a celebration at the culmination of the unit.
- **Conduct a Christy Hale author study with her other Lee & Low titles.** Christy Hale's books include: *Todos Iguales/All Equal* (<https://www.leeandlow.com/books/todos-iguales-all-equal>), *Dreaming Up: A Celebration of Building* (<https://www.leeandlow.com/books/dreaming-up>), and *The East-West House: Noguchi's Childhood in Japan* (<https://www.leeandlow.com/books/the-east-west-house>).
- **Make connections among the texts.** What themes do Christy Hale's books have in common? How are the topics similar? How are they different? What do you think is Christy's message to her readers across all her books? What do you think her interests are? How do the themes vary across the books? Where do you think she gets inspiration for writing her books? Have students write their thoughts in a comparative essay. Consult Reading Rockets' Author Study Toolkit for more information, resources, and activities to use during an author's study

(https://www.readingrockets.org/content/pdfs/authortoolkit_rr.pdf).

- **As a follow-up activity, develop questions for an interview with author/illustrator Christy Hale.** What was her process behind creating *Copycat: Nature-Inspired Design Around the World*? What was her inspiration for writing a story featuring nature-inspired design/ biomimicry? What kind of research did she do while writing the book? Read the information at the end of the book with students and have them discuss what they learned and how it made them think about the poems, illustrations, and photographs differently. Why did you think she created this book for young readers? Consider reaching out to Christy Hale for a virtual author/illustrator visit and present the questions generated from this activity (<https://www.christyhale.com/visits>).
- **Conduct a figurative language study with students.** Have students go on a figurative language scavenger hunt in *Copycat: Nature-Inspired Design Around the World*. Refer to Read Write Think's "Figurative Language Resource Page" as a tool for students to use during their search (http://www.readwritethink.org/files/resources/lesson_images/lesson79/figresource.pdf). Create a chart with different rows for figurative language forms (i.e. simile, metaphor, personification, etc.) and students can fill in the chart with specific examples from *Copycat: Nature-Inspired Design Around the World*.
- **Have students learn about different poetic forms.** Display different books of poetry for students. Ask each student to select a poem, find out and research the poetry form used, and then write a poem in the same form. (The "Tanka" section at the end of *Copycat: Nature-Inspired Design Around the World* will help students understand the features of tanka, if they choose a poem written in this form.) What are the features of the poetic form used to write the poem chosen? Use the resource from Read Write Think to refer to different types of poems. (The "Tanka" section at the end of *Copycat: Nature-Inspired Design Around the World* may also be used to help students understand the features of tanka, if they choose a poem written in this form.)
- **After students examine the poems in more detail, ask each student to write a poem in a style of their choosing about a childhood memory, their community, anything related to their identity, or something in nature or the outdoors that inspired them** (http://www.readwritethink.org/files/resources/lesson_images/lesson417/poetry-forms2.pdf). Students may also compare the features of different poetic forms to tanka, the form used for the poems in *Copycat: Nature-Inspired Design Around the World*.
- **Conduct a poetry study, specifically focusing on tanka.** Use the school and/or public library to acquire additional poetry anthologies containing poems written as tanka. Before reading the poems, refer students to the "Tanka" section at the end of the book for a brief discussion of the features of tanka. After reading some of the poems, ask students what they like about reading tanka. Students may write their own tanka and share their poems with a partner, a small group, or the whole class. Consult different poetry anthologies or books specifically focused on tanka. Read some examples of tanka poetry at this link to begin students' writing processes (<https://www.atlaspoetica.org/25-tanka-for-children-and-educators/>). Afterward, have students reflect on what it was like to write tanka and how it differs from other poetry they've written or read.

Social Studies/Geography

(Reading Standards, Key Ideas and Details, Strands 1–3, Craft and Structure, Strands 4–6, Integration of Knowledge & Ideas, Strands 7–9, Range of Reading of Text Complexity, Strand 10)

(Writing Standards, Text Types & Purposes, Strands 1–3, Production & Distribution of Writing, Strands 4 and 6, and Research to Build & Present Knowledge, Strands 7–9, Range of Writing, Strand 10)

(Speaking and Listening Standards, Comprehension and Collaboration, Strands 1–3, Presentation of Knowledge and Ideas, Strands 4–6)

- **Conduct a research study on the history of tanka.** Have students consult the “Tanka” section and sources at the end of the book to begin the research study, and then add online resources, as well as books in the classroom, school, and public library about tanka to create an informational poster about the poetic form. Consult the NEH’s EDSITEment! Lesson Plan, “Tanka: Japanese Poetry” for more information (<https://edsitement.neh.gov/lesson-plans/japanese-poetry-tanka-youre-welcome>). Students can think about the following questions while they’re researching tanka: When was tanka created? How was tanka created? Who created tanka? Why does tanka follow a particular format? Where tanka typically about in ancient Japan? What are modern-day tanka about? Students can present photographs and examples of tanka, along with other information they find, on their poster. Students may work independently, with a partner, or in small groups., as well as books in their school or public library.

Science/STEM

(K-ESS3-3 Earth and Human Activity: Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment; MS-LS2-5: Ecosystems: Interactions, Energy, Dynamics: Evaluate competing design solutions for maintaining biodiversity and ecosystem services;

(MS-PS3-4: Energy: Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample)

- **Examine the natural resources in your community and examine how they can be used for sustainability and to help the environment around you.** Students can research the natural resources local to their own environment. National Geographic’s “Reading a Resource Map” (<https://www.nationalgeographic.org/activity/reading-resource-map/>) provides additional context and information about natural resources, where they come from, and how we can use them. Students can learn more about the natural resources available in their community and state, and how to utilize those resources for sustainability purposes. Students can present what they learned in an essay, providing details about the resources they learned about and how they can utilize those resources as a community.
- **Ask students to read through the text and backmatter material at the end of the book to create an informational poster about nature-inspired design/biomimicry to share with their school community.** Using the information in the book and additional research, students can create posters using photographs, facts, diagrams, and informative captions. What is nature-inspired design/biomimicry? What are some examples in the story that they can share? What are some additional examples students find through their own research? Students can work in small groups to create their posters and then share their presentations with the rest of the class and the school as a whole. Consult the Biomimicry Institute for additional information, resources, and videos to inform students’ research (<https://biomimicry.org/>). Afterward, have students reflect on how they can use what they learned about nature-inspired design/biomimicry in their own lives and their school community.

- Have students conduct an in-depth research study on one of the natural object-innovation pairs in the book.** Students can refer to the poem, backmatter, and sources in the back of the book to inform their research. Students can create an informational poster detailing their findings. Ask students the following guiding questions to inform their research: How does the natural object inform the innovation? How was the innovated object created from the natural design? Who initiated the design, and what people worked on it? How did they discover the natural pairing? What sparked their imaginations? Ensure students cite their work throughout the research process.
- Select another pairing that features nature-inspired design.** Using online resources, and the information in the book's backmatter, have students select a unique pairing of an object in nature with a designed object or technology from the world around us and learn how they are examples of nature-inspired design/biomimicry. Students can present their findings with an informational poster detailing their research along with photographs and other resources, including citations. Have students think about the following questions during their research: How does this pairing demonstrate nature-inspired design? How does the design use elements ideas from the natural object to inform how the innovation functions and works? How can we learn from nature-inspired design after investigating this pairing? Consult the Biomimicry Institute (<https://biomimicry.org/>) (<https://biomimicry.org/four-engaging-ways-bring-biomimicry-classroom/>) as well as National Geographic's "The biomimicry innovations inspired by Earth's colder climes" (<https://www.nationalgeographic.com/environment/article/partner-content-earths-colder-climes>), Ohio State's "Biomimicry: A History" (<https://ehistory.osu.edu/exhibitions/biomimicry-a-history#:~:text=Silk%20is%20one%20of%20the,learn%20from%20the%20brilliant%20worm.>).
- Have students read other Lee & Low titles about animal conservation and environmental preservation.** These books include *Parrots Over Puerto Rico* ([leeandlow.com/books/parrots-over-puerto-rico](https://www.leeandlow.com/books/parrots-over-puerto-rico)), *Prairie Dog Song: The Key to Saving North America's Grasslands* (<https://www.leeandlow.com/books/prairie-dog-song>), *Puffling Patrol* (<https://www.leeandlow.com/books/puffling-patrol>), and *Everglades Forever: Restoring America's Great Wetland* ([leeandlow.com/books/everglades-forever](https://www.leeandlow.com/books/everglades-forever)). What do the settings in these books have in common? What are their differences? How do people work together to preserve the wildlife and environment in each book? What obstacles do they face in making sure the animals and the ecosystem are restored and/or preserved? Connect these books and the nature preservation efforts presented to what students learned from Copycat: Nature-Inspired Design Around the World. How does animal and environmental preservation have to do with design and innovation? How can we use the environment around us as inspiration? Have students write an essay about their findings, thoughts, and ideas.

Art/Media

(Reading Standards, Integration of Knowledge and Ideas, Strands 7 and 9)

(Writing Standards, Text Types & Purposes, Strands 1-3, Production & Distribution of Writing, Strand 4, and Research to Build & Present Knowledge, Strands 7-9, Range of Writing, Strand 10)

(Speaking and Listening Standards, Comprehension and Collaboration, Strands 1-3, Presentation of Knowledge and Ideas, Strands 4-6)

- Conduct an illustrator study on Christy Hale using her Lee & Low titles.** Christy Hale's books include: *Todos Iguales/All Equal* (<https://www.leeandlow.com/books/todos->

iguales-all-equal), *Elizabeth's Doll* (<https://www.leeandlow.com/books/elizabeti-s-doll>), *Mamá Elizabethi* (<https://www.leeandlow.com/books/mama-elizabeti>), *Amazing Places* (<https://www.leeandlow.com/books/amazing-places>), *Dreaming Up: A Celebration of Building* (<https://www.leeandlow.com/books/dreaming-up>), *The East-West House* (<https://www.leeandlow.com/books/the-east-west-house>), and *Sky Dancers* (<https://www.leeandlow.com/books/sky-dancers>).

Display the books so students can examine the illustrations. Then ask students to brainstorm how Christy Hale's work is similar across the books, and how it differs book-to-book. What is Christy Hale's artistic style? What kinds of materials do you think she uses to create her illustrations? How does she capture the characters' emotions in each book? What do you think it's like to illustrate a book you have also written? How do you think that differs from just working on the illustrations?

- **Using inspiration from their environment and local community, have each student select an animal or a plant and create their own invention using the design inspiration from the natural object.** Students can choose an artistic medium they prefer, such as painting, sculpture, or collage, from materials in the classroom. Ask students: Why did you select that natural object to inspire your design? What did you see in that natural object that motivated you to create your invention? What did you select to put in your art piece? Students may share their final pieces with a partner, a small group, or the whole class. As a follow-up activity, students may write a tanka to go alongside their art piece to mimic the design layout of *Copycat: Nature-Inspired Design Around the World*.
- **Encourage students to select the illustration that resonated with them the most from *Copycat: Nature-Inspired Design Around the World*.** Have students write a reflection about the illustration. What stood out to them? How did the illustration make them feel? What did the illustration make them think about?
- **Create an artistic piece to pair with students' poems from any of the poetry writing activities in this Teacher's Guide.** After students write their nonfiction poems or tankas, have students pair an artistic piece with their poems using inspiration from nature to guide their artistic processes. Students can share their poems and artwork afterward and discuss what it was like to use nature to inspire both their writing and art.
- **Examine Christy Hale's use of photographs alongside illustrations in *Copycat: Nature-Inspired Design Around the World*.** Why do you think Christy Hale decided to include photographs of the innovations instead of illustrations? Why do you think she decided to illustrate the objects from nature? How did this impact your reading of the story and your interpretation of the poems? What do you think it would be like to read the book with all photographs or all illustrations? Have students discuss their thoughts with a partner, a small group, or the whole class. As a reader, do they prefer illustrations or photographs, and why? What are the benefits of both artistic mediums in a picture book?
- **Encourage students to watch the book trailer for *Copycat: Nature-Inspired Design Around the World*** (<https://www.leeandlow.com/books/copycat>). If the necessary equipment is available at school or in students' homes, encourage students to record and edit their own book trailers for *Copycat: Nature-Inspired Design Around the World*. For ideas, check out this Creating Reading Excitement with Book Trailers lesson plan (<http://www.readwritethink>).

[org/classroomresources/lesson-plans/bookreport-alternativecreating-c-30914.html](https://www.readwritethink.org/classroomresources/lesson-plans/bookreport-alternativecreating-c-30914.html)) by ReadWriteThink.org.

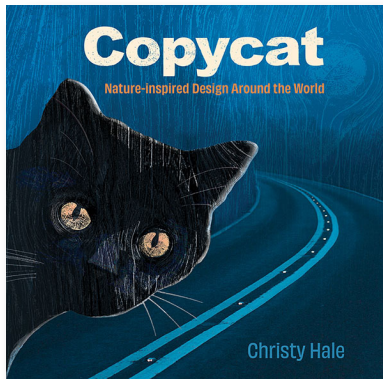
School-Home Connection

(Reading Standards, Integration of Knowledge and Ideas, Strands 7 and 9)

(Writing Standards, Text Types & Purposes, Strands 1-3, Production & Distribution of Writing, Strand 4, and Research to Build & Present Knowledge, Strands 7-9, Range of Writing, Strand 10)

(Speaking and Listening Standards, Comprehension and Collaboration, Strands 1-3, Presentation of Knowledge and Ideas, Strands 4-6)

- **Encourage students and their families to look at the Biomimicry Institute's website (<https://biomimicry.org/>) to learn more about the nature-inspired design/ biomimicry featured in *Copycat: Nature-Inspired Design Around the World*.** Encourage students and families to share the details of the wildlife and nature they see in their communities and how they have inspired the design of objects they use in their daily lives.
- **If possible, have students and families go on a nature walk around their community during their free time.** Students and families can bring a notebook to jot down what they observe, keeping in mind the concepts presented in *Copycat: Nature-Inspired Design Around the World*. What do they see? What do they enjoy about being in nature? Do they observe anything around them that has inspired the design of objects they use in their daily lives? Students can share out their findings with a partner, a small group, or the whole class.



ABOUT THE AUTHOR & ILLUSTRATOR

Christy Hale is the author and illustrator of several acclaimed children's books, including three others published by Lee & Low Books. She has illustrated numerous award-winning picture books as well. Many of the books Hale has authored are inspired by her interest in design and how it relates to all aspects of life. Hale and her husband live in Palo Alto, California. You can find her online at christyhale.com.

REVIEWS

"VERDICT: A fascinating and creative look at a little-known STEM topic that is accessible to a wide audience. Highly recommended."—*Publisher's Weekly*, **starred review**

"Inspiring, lovely to look at, and well presented."—*Kirkus Reviews*

"A true STEAM book."—*Booklist*

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