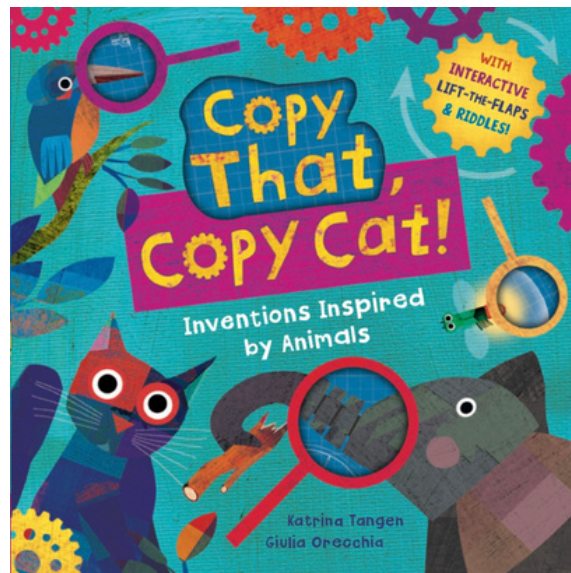


TEACHER'S GUIDE



COPY THAT, COPY CAT! INVENTIONS INSPIRED BY ANIMALS

KATRINA TANGEN

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WHAT'S BIOMIMICRY?

MUSIC & MOVEMENT

“Bio(s)” means “life. “Mimicry” means “imitate.” This song makes it easy to remember!

LISTEN

Listen to “What’s Biomimicry” by The Missoula Coyote Choir & Friends

[YouTube](#) [Spotify](#) [Apple Music](#)

SING

Sing along with the kids!

MOVE

Add motions when the kids say “life” and “imitate”!



Enjoy the rest of the *Ask the Planet* album & Check out [AskNature's Teacher Guide](#) for activities to go with the other songs!

When the kids say this:

Do this:

“LIFE!”

Jump with arms in the air



“IMI-”

Right hand on hip



“-TATE”

Left hand on hip



Seated Variation: Throw hands in air on “Life”. On “Imitate,” put hand on right leg, then left.

SODA CAN SUBMARINE

SUPPLIES

- Tall vase, pitcher, or pot
- Plastic tubing or an extra long straw
- Empty soda can

INSTRUCTIONS

1. Add water to the vase until $\frac{3}{4}$ full.
2. Place one end of the tubing in the soda can.
3. Fill the soda can with water. Place it in the vase. Add extra water if necessary to make it completely full so it will sink.
4. Blow air into the tube and watch your submarine rise!

(Watch out! If your end of the tubing is below the water line, water will come out when you stop blowing.)

What happened?

Just like in a real submarine, when you add air, it rises, and when you let in water, it sinks.

Why?

Adding air makes the submarine lighter compared to its size, so it floats.
Adding water makes it heavier compared to its size, so it sinks.



*Source:
Adapted with permission from The Science Kiddo blog by Crystal Chatterton,
<https://www.sciencekiddo.com/soda-can-submarine/>*



SNOWSHOES

SUPPLIES

- Shallow dish
- Flour or kinetic sand
- 1 or more plastic toy animals or dolls
- Cardboard
- Tape

INSTRUCTIONS



1. Fill the dish half-full with flour (loosely—don't pack it down) or kinetic sand. This is your "snow."

2. Place your toy on the snow without pushing on it. Notice:

- How big are the footprints?
- How deep are the footprints?
- If you have more than one animal, notice if some are different than others.

3. Press your toy into the snow. Notice:

- Is it hard to push the toy into the snow?
- How big are the footprints?
- How deep are the footprints?

4. Ask an adult to cut the cardboard into snowshoes or extra-large paws for your toy. Tape them to the toy's feet.



SNOWSHOES (CONTINUED)

5. Find a clear area of snow, fill a second dish, or smooth and fluff your original snow. Place your snowshoed toy on the snow without pushing.

Notice:

- How big are the footprints?
- How deep are the footprints?

6. Press the snowshoed toy into the snow. Notice:

- How big are the footprints?
- How deep are the footprints?
- Was it easier or harder to push the toy wearing snowshoes?

What happened? Why?

Toys wearing snowshoes don't sink in as far and are harder to push in. Their weight is spread out over the bigger footprint, so they don't push down as hard in any one place.



Sources:

Dees, Sarah, *Frugal Fun for Boys and Girls* blog,

<https://frugalfun4boys.com/science-experiment-how-snowshoes-work/>

Children's Science Center, <https://www.childsci.org/test/how-snow-shoes-work>



LIFT: HOW PLANES FLY



Bird and plane wings are curved on top and flat on bottom. According to Bernoulli's Principle, this airfoil shape causes lift.

SUPPLIES

- 1 rectangular strip of paper (around 1.5x8 inches)

INSTRUCTIONS

1. Predict: Will blowing across the top of the paper make it go up or down?
2. Hold the short end of the paper below your bottom lip.
2. Blow evenly across the paper.

Tip: If it doesn't work, you may be blowing too hard. Or you might need to angle your breath down more, towards the top of the paper.

What happened? Why?

It seems like blowing on top should make it go down, but it makes it go up! This is because the faster air has lower pressure, so the higher pressure underneath pushes up.

Watch this video from the Air & Space Museum to see a demonstration and learn more: https://www.youtube.com/watch?v=3b9xCC_vaZQ



LIFT #2: MAGIC SODA CANS

SUPPLIES

- 1 straight drinking straw
- 2 empty soda cans

INSTRUCTIONS

1. Predict: Will blowing between soda cans move them apart or together?
2. Place 2 empty soda cans on a table, close but not touching (about $\frac{3}{4}$ inch apart).
3. Position the straw in front of the gap (don't stick the straw in-between the cans), aiming about an inch from the bottom.
4. Blow through the straw.

What happened?

It seems like blowing between the cans should make them spread apart, but they come together!

Why?

The air you blow through the straw moves faster than the rest of the air in the room. Faster air has lower pressure, so the stronger air pushes the cans together. That's the same thing that happens when air goes around a bird or airplane wing, causing lift!



Find the above photo and other fun lift experiments in this NASA educator's guide:
<http://tinyurl.com/3vzzssz3>

GOOD COPYCAT OR BAD COPYCAT?

LANGUAGE ARTS

Just like engineers can be inspired by nature, writers can be inspired by books! One inspiration for **Copy That, Copy Cat!** was Abi Cushman's picture book **Animals Go Vroom!**. Let's learn how to be good copycats in our writing.

READ

Read **Copy That, Copy Cat!** and **Animals Go Vroom!**

COMPARE

Compare and contrast the elements of the books, using a Venn diagram. Do they use the common elements in different ways?

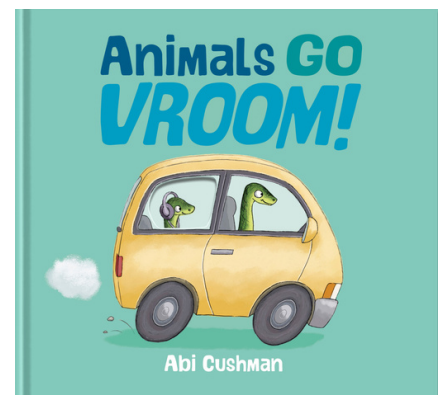
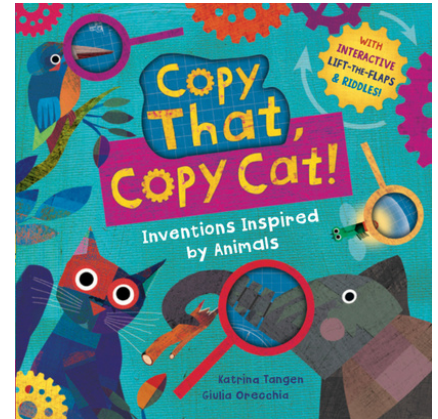
(Some possible elements: die-cuts, fiction vs. nonfiction, riddles, interrupted rhyme, animals, "trick" picture, art styles, flaps, exclamation marks, sound effects, etc.)

DISCUSS

Katrina was inspired by the page-turn surprises and die-cuts in Abi's book. Is this a good or bad kind of copying? Why? What's the difference between inspiration, cheating, and plagiarism?

CREATE

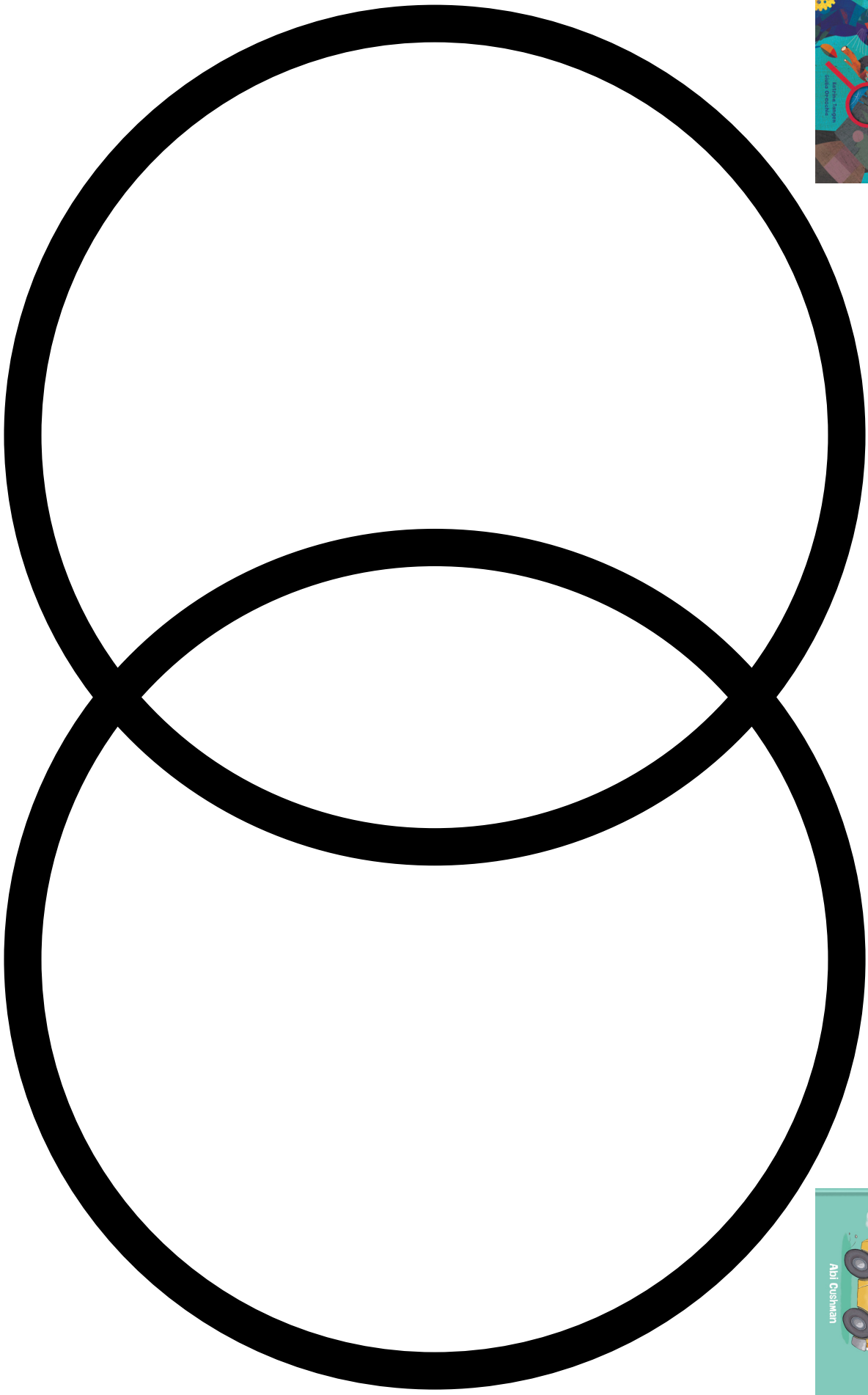
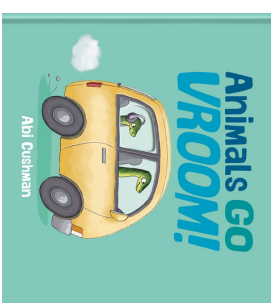
Choose an element from either book to copy. Make an art project, story, presentation, or picture book using the same element in a new way!





Copy That, Copy Cat!

Animals Go Vroom!





Copy That, Copy Cat! Discussion Guide

Scientists use nature to inspire all sorts of cool inventions! *Copy That, Copy Cat!* introduces us to many of these inventions, from sonar inspired by bats to submarines inspired by fish.

1. What do flippers and polar bear paws have in common?
2. This book is about biomimicry. “Bio” means life. Can you think of any other words that have “bio” in them? (Some examples are: biology, biosphere and biofuel. Look these up with a grownup to find out what they mean!)
3. “Mimic” means copy. Copying is an important way we learn new things.
For instance, babies try to copy how older kids and grownups speak and move so that they can learn too. Sometimes it helps if someone shows us how to do something, like a dance move, so that we can copy and learn it. Can you think of a time when you’ve copied someone or something so that you could learn something?
4. Have you used or seen any of the inventions in the book in real life?
Which invention from the book would you most like to try out?
5. What was something that surprised you in the book?
6. Imagine you wanted to invent a really tricky game of hide and seek to play with your friends. What kinds of animals or plants are very good at hiding? How could you imitate something from nature to invent your game?



Copy That, Copy Cat!
Written by Katrina Tangen
Illustrated by Giulia Orecchia



Illustration © Giulia Orecchia
from Copy That, Copy Cat!



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Copy That, Copy Cat! Activity

DESIGN YOUR OWN ANIMAL-INSPIRED INVENTION! | For ages 5+

We can study plants and animals to see how they work and make inventions that work the same way. *Copy That, Copy Cat!* introduces us to many human inventions that were inspired by animals. You can design your own animal-inspired invention too using the worksheet included here!

1. Choose an animal and read about it at the library or online.
2. On the worksheet on the next page, make a list of cool things the animal can do. These are called functions.
3. Choose a function from your list. Brainstorm inventions that could work the same way. (Or a current invention that you could improve.)
4. Design your invention!
5. How would it work? What parts might cause problems? How could you fix those?
6. What could you make it out of? Should it be made of something hard or soft? Light or heavy? Metal, glass, plastic, cloth and cardboard are some materials you could consider.
7. Draw your invention or make a model. Write or tell someone about how it works!

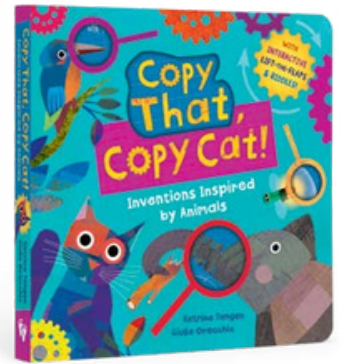
MY OWN ANIMAL-INSPIRED INVENTION

My name: _____

1. Name of animal: _____

2. Functions (things the animal can do): _____

Circle a function above that you'd like to focus on.



Copy That, Copy Cat!
Written by Katrina Tangen
Illustrated by Giulia Orecchia



Illustration © Giulia Orecchia
from Copy That, Copy Cat!



Barefoot Books
step inside a story

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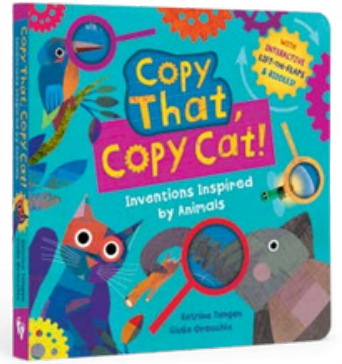
3. Inventions that could work the same way as the function you chose:

4. My design:

How it would work:

Materials needed to make it:

5. Drawing of my invention:



Copy That, Copy Cat!
Written by Katrina Tangen
Illustrated by Giulia Orecchia

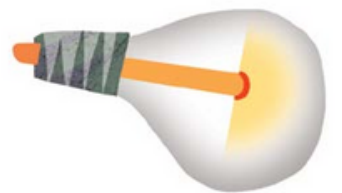


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