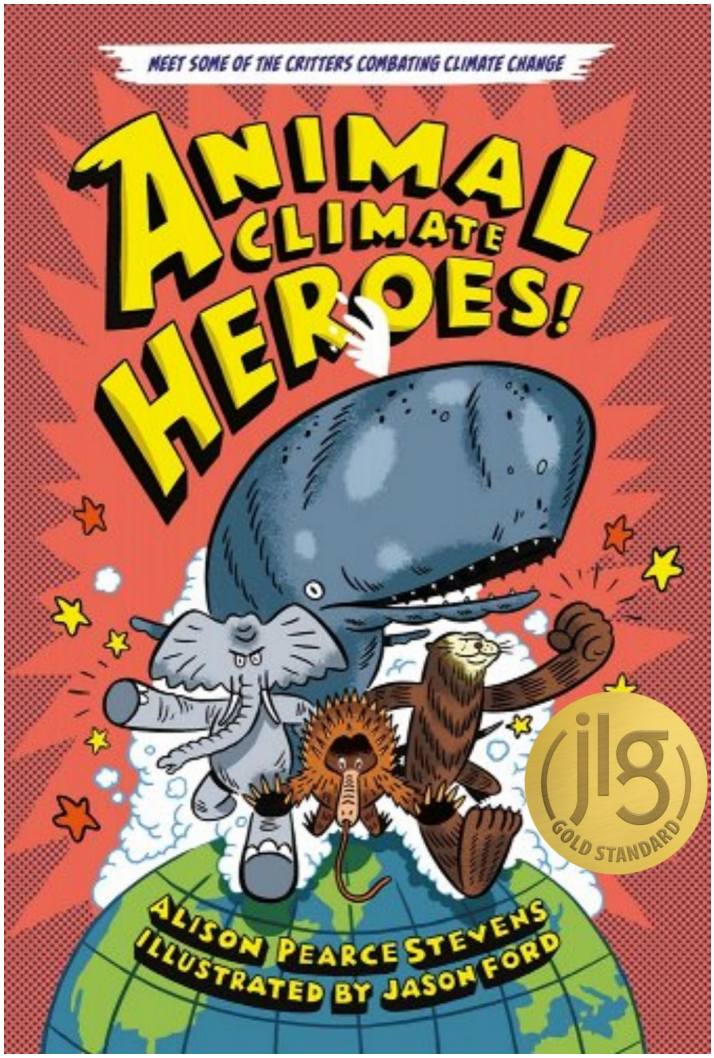
Educator's Guide



Animal Climate Heroes

by Alison Pearce Stevens

Junior Library Guild Gold Standard Selection

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www.apstevens.com

Guide Created by Annette Whipple

Educator's Guide

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Meet the Author

Alison Pearce Stevens has been chased by a trumpeter swan, bitten by a bronze-winged duck, and served as a climbing wall for geckos and baby bats. She used to be a beekeeper and still thinks pollinators are some of the coolest things on the planet.

Once upon a time, she was Dr. Stevens, science professor, until life took her overseas, at which point she started writing about science and nature for kids, because she's an educator at heart and had to find new ways to share cool things with the world's most curious people. Alison now writes award-winning nonfiction books to inspire kids to protect the world outside their doorstep.

She is the author of Junior Library Guild Gold Standard books *Rhinos in Nebraska: The Amazing Discovery of the Ashfall Fossil Beds* (which won the Nebraska Book Award in three categories) and *Animal Climate Heroes!.* She co-authored National Geographic Kids Books' *5,000 Awesome Facts 3* and three books in their Weird But True series and has published hundreds of STEM-based magazine and online articles for kids.

www.apstevens.com

How to Use This Guide

This guide is designed for use in elementary classrooms and can be modified for younger and older students. The reading, writing, and STEM activities provided can be adapted to meet students' needs and learning levels while meeting curriculum standards. Five printable worksheets are included.

A Note for the Teacher:
As children learn more about the changing world and its environment, many are discouraged. Some are angered. In others, it leads to a form of anxiety called eco-anxiety. You can learn more about eco-anxiety at these links.

https://emagazine.com/eco-anxiety-what-it-is-and-how-to-cope-with-it/

https://www.healthline.com/health/eco-anxiety

https://www.bbc.com/future/article/20220315-how-eco-anxiety-affects-childrens-minds

https://www.nais.org/learn/independent-ideas/june-2022/eco-anxiety-what-it-means-for-our-kids-and-how-they-are-taking-action/

How to Share This Guide

Please share this guide with other educators and interested people by sending them to my website. Thank you!

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Climate Change Lesson

Though many students know the term “climate change,” many do not have thorough background knowledge. Prior to reading *Animal Climate Heroes!*, review or introduce climate change in your classroom. For a complete climate change unit, additional resources are provided below.

If students have previously studied climate change, you might consider using a KWL chart in addition to these discussion ideas.

Climate vs Weather

Ask: *What is weather? What is climate?*

Reinforce student answers and clarify:

Climate and weather both are ways to talk about what it’s like outside.

Weather describes what happens outside for a moment of time. (Sunny, humid, windy.) Weather is temporary. Understanding today’s weather helps you know how to dress for the day. (Rainboots, shorts, winter coat—or layers, since the weather might change quickly.)

Climate describes what happens outside over a long period of time. Climate is what the weather is typically like. Depending on where a person lives, they may never need a winter coat. Others may never wear shorts or sandals.

The big difference between weather and climate is time.

Climate Change

Ask: *Who has heard the term climate change?*
Ask: *Thinking about what you already know and what we just said climate means, what do you think climate change is?*

Reinforce student answers and clarify:

Climate change means the typical long-term climate (temperature and precipitation) for a region or large area has begun to shift.

Earth’s climate has changed over time. (Consider discussing ice ages and warming periods.)

Scientific research shows that, generally, the earth’s atmosphere (made of gases) is warming. This is called global warming.

The atmosphere is not warming quickly. We may not notice it where we live. But scientific weather records show how weather has changed over the past hundred years.

However, even warming **one or two degrees** can dramatically impact the health and habitats of plants and animals on land and in the ocean.

Carbon
Ask: *Who has heard of carbon?*
Ask: *Who can tell me something about carbon?*

Reinforce student answers and clarify:

Carbon is an element. It is in every living thing on Earth. It is also in Earth's atmosphere.

Carbon dioxide is a gas. It combines carbon and oxygen and is different from pure carbon. Carbon dioxide comes naturally from many things, including us! Humans exhale carbon dioxide. Breathing doesn't hurt the atmosphere. However, in the past several hundred years, a significant amount of carbon dioxide has been created by human activities, particularly burning of gasoline and other fossil fuels.

This has caused global warming. It doesn't just hurt plants and animals. Warmer temperatures are causing ice caps to melt. This causes sea levels to rise, which changes coastlines. Over time, some coastal cities and towns—and their homes and businesses—may disappear.

Carbon and Climate Change Connection
In the atmosphere, carbon dioxide and methane (which also contains carbon) trap the sun's heat. This is why they are called greenhouse gases. The trapped heat leads to a warmer planet.

Ask: *Does it need to get a lot warmer to change the health and habits of plants and animals?*
Ask: *Who remembers how many degrees difference can change the health and habitats of animals?*

Is there any good news?
Yes!

Nature helps! Plants and trees naturally absorb carbon dioxide. Animals, like the ones in *Animal Climate Heroes!* help plants and trees pull carbon dioxide out of the atmosphere—without even trying.

People can help, too. They can drive cars less and use public transportation, bicycles, or carpool more often. They can grow their own food or purchase food and other products locally. They can use less plastic—especially single-use plastic (such as straws, baggies, and water bottles). They can choose not to litter and pick up any litter they see.

The little things we do make a big difference!

Climate Change Group Exploration
Dive deeper into the questions above with this website.
https://climatekids.nasa.gov/kids-guide-to-climate-change/

Divide students into eight groups based on the questions asked and answered at the website. (Some of the information above overlaps with the website's information.) In small groups, students watch the videos and read information.

Students learn and share in their own words what they learn.

Together, the whole class can watch the video and learn, "What can I do?"

Teacher Tip: Make It Real
Make it personal as much as possible…

- Connect world problems with local problems.
- Connect concern about the world's problems with concern about local problems.
- Connect solutions to the world's problems with solutions about local problems.
- Connect environmental problems with human problems. When we care about our fellow humans, we're more likely to care about the environment.

Additional Resources for Teachers:
https://gpm.nasa.gov/education/weather-climate
https://www.earthsciweek.org/resources/classroom-activities/your-own-greenhouse/
https://www.earthsciweek.org/resources/classroom-activities/
https://soundwaters.org/wp-content/uploads/2020/05/SoundWaters-Distance-Learning-Climate-Change-Lesson-Plans-Supporting-Materials-3-5.pdf
https://www.npr.org/2019/04/25/716359470/eight-ways-to-teach-climate-change-in-almost-any-classroom

Reading Activities

Introduction of *Animal Climate Heroes!*

Before introducing the book, consider having *Animal Climate Heroes!* on display to build curiosity. Then introduce the book through discussion of the cover.

1. Draw attention to the cover. Ask students what they notice.
2. What makes a hero?
3. What might an animal climate hero do?
4. Based on the cover, how many animal heroes might be included in the book?
5. Continue the discussion about superheroes.
    a. What's another name for a superhero's enemy? *villain*
    b. What's another name for a superhero's helper or partner? *sidekick*
    c. Briefly brainstorm some examples.

    If you aren't familiar, tell the students you want them to teach you about superheroes. Be sure to recognize not all kids are into the movies, comics, or superheroes in general. Many may not be allowed to watch movies and shows due to content ratings. However, many will know a bit about them. You may also want to acknowledge that comic books and movies are often similar but don't always align perfectly.

    Take it beyond superheroes. What about other fictional movies and books have heroes and villains? What about books like *Amari and the Night Brothers*, *The Mysterious Benedict Society*, or a book you read as a class? (Some villains may not be all bad!)

Superhero	Sidekick	Villain
Batman	Robin	Joker
Captain America	Bucky	Red Skull
Wanda	Vision	Agatha
Black Panther	Shuri	Killmonger

6. Briefly continue the good guy/bad guy discussion. Can there be heroes and villains in real life? Have students give examples (without being personal). Remind them that heroes help. (Or guide them using ideas from history such as 9/11 and World War II using caution to not place ethnic groups as villains instead of organizations or countries.)
7. Inform students *Animal Climate Heroes!* explores the superheroes, sidekicks and villains of climate change. These animal heroes help climate change without even trying.

Reading Suggestions

Read and discuss small sections of *Animal Climate Heroes!* each day. Complete it as a read aloud or with each student reading their own book.

Complete the discussion questions below after completing an animal chapter.

Begin each day with a brief review of previous content prior to reading.

Discussion of *Animal Climate Heroes!*

Great Whales

- Describe how most great whales eat.
- How does a great whale's poo-nado help phytoplankton?
- When plankton and phytoplankton eat from a great whale's poo-nado, how does that help reduce carbon?
- In addition to fertilizer, how does a great whale help the ocean when it dies?

Sea Otters

- Describe what kelp looks like and how it grows.
- How do sea otters protect kelp forests?
- Kelp stores carbon inside it. What happens to the carbon if the kelp sinks to the ocean floor? What happens to the carbon if the kelp washes up on shore?
- How do sea urchins hurt kelp forests when there are too many urchins?

Forest Elephants

- Why are forest elephants not likely to be seen at a zoo?
- What do forest elephants do to help some trees grow big?
- How does elephant poop help tree seeds grow?
- How do trees help reduce carbon?

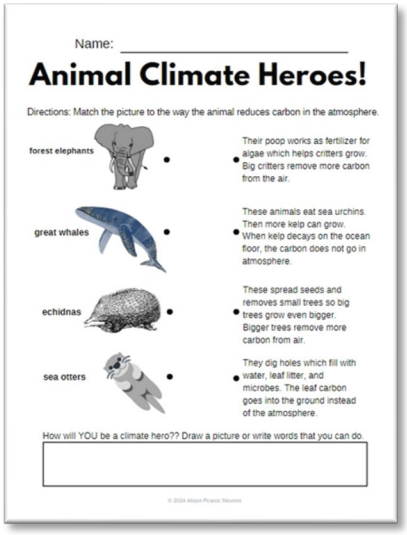
Short-Nosed Echidna

- Why do short-nosed echidnas dig in soil?
- What collects in the pits echidnas dig that helps reduce carbon in the atmosphere?
- What are microbes? Why are insects, spiders, and similar creatures not officially microbes?
- How do animal diggers help ecosystems?

Animal Climate Heroes Worksheet

After completing the book, have students discuss and summarize how each animal helps reduce carbon in the atmosphere.

Then have students work independently to complete the worksheet.



Name: _____

Animal Climate Heroes!

Directions: Match the picture to the way the animal reduces carbon in the atmosphere.

forest elephants

Their poop works as fertilizer for algae which helps critters grow. Big critters remove more carbon from the air.

great whales

These animals eat sea urchins. Then more kelp can grow. When kelp decays on the ocean floor, the carbon does not go in atmosphere.

echidnas

These spread seeds and removes small trees so big trees grow even bigger. Bigger trees remove more carbon from air.

sea otters

They dig holes which fill with water, leaf litter, and microbes. The leaf carbon goes into the ground instead of the atmosphere.

How will YOU be a climate hero?? Draw a picture or write words that you can do.

Sea Urchins Worksheet

Students complete the sea urchin worksheet during or after reading pages 29-39.

Encourage students to use another source to add a new fact to the center box.


Name _____

Sea Urchins

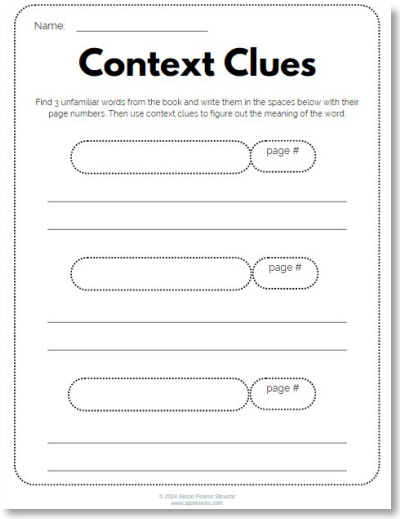
Color the boxes that are a true about sea urchins.
Place an X in the boxes that are false.
Add your own fact to the empty box.

plant	big appetite	good sense of smell
bright colors	5 teeth	small size
powerful jaws		dull colors
ocean habitat	large size	important
good vision	powerful claws	animal

Context Clues Worksheet*

Prior to beginning the book, provide students with the Context Clues Worksheet and discuss it with students. Consider if you want the three words to be found in different chapters. Students might also keep an ongoing list on the back of the paper of new or unfamiliar words.

* The context clue worksheet is best used when each student has their own book.


Name: _____

Context Clues

Find 3 unfamiliar words from the book and write them in the spaces below with their page numbers. Then use context clues to figure out the meaning of the word.

page #

page #

page #

Writing & Research Activities

Everyday Heroes

Remind students climate change is an environmental problem that affects people, plants, and animals—the whole world. There are other problems in the world, too. Lead a brief discussion about some problems students see at school and in your community. Explore ideas such as wasting electricity, single-use straws, graffiti, litter, not enough playground toys (or food options or winter coats for kids or affordable housing) in addition to feelings of exclusion, loneliness, bullying, and more.

Say: *The world has a lot of problems. Big problems. But the best way to tackle big problems is to start small. Begin with just one small step. One small action. One hero step. We can take steps to be an everyday hero.*

Discuss how one person making a small change helps others. And this helps the world.

Teach the students the sign for "Me, too." Encourage students to sign "Me, too" when they agree with another person's idea of what one small step can look like to make our community a better place. (Use the sign in all subjects and throughout the school year.)

Me, Too
Learn how to sign, "Me, too" or "Same." Then teach it to your students!
https://youtu.be/d2OqKBVvVLA

Remind the students of *Animal Climate Heroes!*
Ask: *Who can be a hero?* (Everyone.)

Say: *Every living being on this planet impacts others. Even me. Even you. Each of us has the potential to help our community and that helps the world.* (Remind students a community can be a home, classroom, neighborhood, town…)

While brainstorming, write students' ideas down so they can see the many opportunities they all have.

Discuss what one small step can look like toward
- kindness
- acceptance
- happiness
- peace
- and more

Continue with one small step toward
- less wasted electricity as a classroom
- choosing less single-use plastic
- a cleaner cafeteria (or library or playground)
- a safer home for animals and people
- a classroom or school food/toiletry pantry
- and more

Kids can…
• pick up litter • turn off water when brushing teeth • drink from reusable water bottles •turn off lights • volunteer • reuse or recycle • use fewer plastic straws • walk, bike, or use public transportation if applicable • not waste food • upcycle • use scrap paper • plant flowers and gardens • take short showers • use reusable shopping bags •

During the discussion, acknowledge grown-ups control some things. Remind students how Alison Pearce Stevens suggests we talk to adults about things like lawncare.

Ask: *What else from the brainstorming list would need the support of an adult*? *Which can we do without help*?

Students trace their foot or shoe on paper and write a word or phrase from the brainstorming session on it.

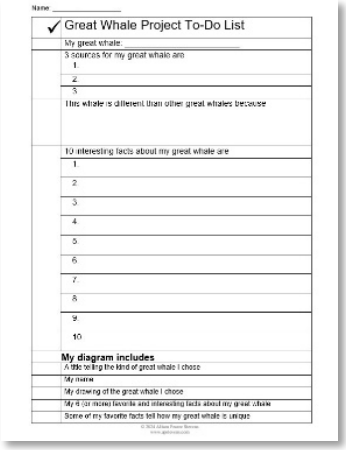
Older students might list specific ways they can meet their goal to improve the world.

Display all the ways your class helps the world by showcasing the footprint pledges. Remind students that we tackle a big problem one step at a time. As students hang their footprint pledge, thank them for giving the world hope.

Change Begins with Me Writing Prompts

- I want to help decrease climate change because…
- I know one person can make a difference because…
- Even small changes are important because…
- One change I can make is…
- I can be a hero at home by…

Great Whale Project


Name _____

✓ Great Whale Project To-Do List

My great whale: _____

3 sources for my great whale are
1.
2.
3.

This whale is different than other great whales because

10 interesting facts about my great whale are
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

My diagram includes
A title telling the kind of great whale I chose
My name
My drawing of the great whale I chose
My 4 (or more) favorite and interesting facts about my great whale
Some of my favorite facts tell how my great whale is unique

Of the great whales listed in *Animal Climate Heroes!,* students choose a whale to research using the worksheet to keep track of notes. Next, they create informational diagrams about their whales.

Students will use three sources to research the animal. Use the worksheet to guide students to help meet expectations.

Emphasize the need for the facts to be specific to the students' specific whale species.

STEAM Activities

Class Carbon Footprint

Introduce the idea of the invisible footprint called a carbon footprint.

carbon footprint: the amount of carbon dioxide (greenhouse gases) produced because of our daily lives as humans

How we travel, what we use, food we eat, and more contribute to our personal carbon footprint.

Learn More About Carbon Footprints
- https://www.nationalgeographic.com/environment/article/what-is-a-carbon-footprint-how-to-measure-yours
- https://www.conservation.org/stories/what-is-a-carbon-footprint

Carbon Footprint Activities for Kids
- https://www.nps.gov/choh/learn/kidsyouth/carbon-footprint-activity.htm
- https://www.kitchencounterchronicle.com/what-is-carbon-footprint-stem-kids/

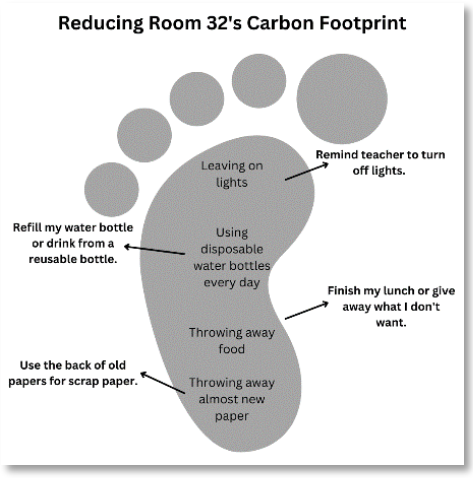
Calculate a Household Carbon Footprint
- https://www3.epa.gov/carbon-footprint-calculator/

Admit your own mistakes related to wasting electricity, water, and/or plastic.

Explain once you learned the importance of saving water, electricity, and plastic, you were intentional about the changes you made. (Give examples…shorter showers, using disposable water bottles as little as possible, turning off lights, turning off water while brushing teeth.)

Discuss what the class can do at school to use less water and electricity:

- Turning off lights when classroom is empty
- Riding the bus, walking, riding bike, or car pooling to school
- Use the back of worksheets as scrap paper
- Unplug devices once charged
- Eat all of lunch (and snacks)
- Drink from reusable water bottles



1. Draw a giant footprint on butcher paper or posterboard. Give the poster a title like “Reducing Room 32’s Carbon Footprint.”
2. Have students call out ways the class has made a carbon footprint. Write them on the footprint.
3. For each item, brainstorm together what the class can do to reduce their carbon footprint. Add the solutions to the poster.
4. Display the class footprint in the classroom as a reminder.

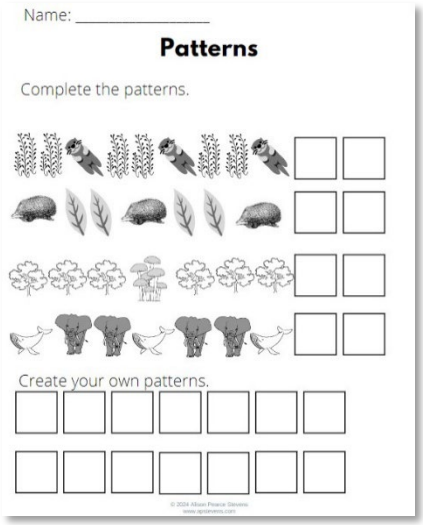
Optional if not completing the Everyday Heroes activity from above: Though students may not have control over everything that happens at home, there are some things they can do to have a smaller carbon footprint. Discuss or ask these questions and if they could change.

- Do you leave the water running when you brush your teeth?
- Have you forgotten to turn off a light when you aren't in a room?
- Do you leave the TV or fan on when you're not in the room?
- Do you throw away food that you don't want to eat?
- Do you use disposable water bottles?
- Do you take long showers?
- Do you use baggies instead of reusable containers?

Animal Climate Heroes Pattern Worksheet

Students complete the patterns.

Encourage students to keep their drawings simple.


Name: _____

Patterns

Complete the patterns.

Create your own patterns.

Recommended Books

Save the People! Halting Human Extinction by Stacy McAnulty
*We are All Greta: Be Inspired to Save the World b*y Giannella, Valentina, and Manuela Marazzi
What a Waste: Trash, Recycling, and Protecting our Planet by Jess French
Drawn to Change the World Graphic Novel Collection: 16 Youth Climate Activists, 16 Artists by Emma Reynolds
What is Climate Change? By Gail Herman
Our House Is on Fire: Greta Thunberg's Call to Save the Planet by Jeanette Winter
Not Your Typical Book About the Environment by Elin Kelsey and Clayton Hanmer
It's Getting Hot in Here: The Past, Present, and Future of Climate Change by Bridget Heos
No World Too Big: Young People Fighting Global Climate Change edited by Lindsay Metcalf, Keila Dawson, and Jeanette Bradley
Let's Save Our Planet: Forests by Jess French
Our World Out of Balance: Understanding Climate Change and What We Can Do by Andrea Minoglio Laura Fanelli

Thank You!

Thank you for using *Animal Climate Heroes!* in your classroom. Please share any class projects with Alison Pearce Stevens on social media.

www.apstevens.com

If you're looking for additional ways to reduce your impact on the planet, check out One Simple Thing, a free, twice-monthly Substack by Alison Pearce Stevens.

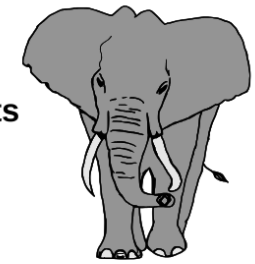
ONE
SIMPLE THING

Name: _____

Animal Climate Heroes!

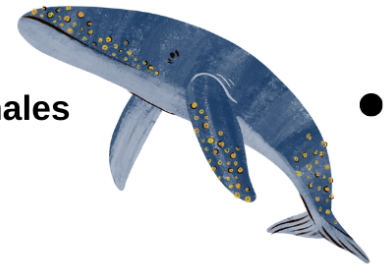
Directions: Match the picture to the way the animal reduces carbon in the atmosphere.

forest elephants



- Their poop works as fertilizer for algae which helps critters grow. Big critters remove more carbon from the air.

great whales



- These animals eat sea urchins. Then more kelp can grow. When kelp decays on the ocean floor, the carbon does not go in atmosphere.

echidnas

- These spread seeds and removes small trees so big trees grow even bigger. Bigger trees remove more carbon from air.

sea otters

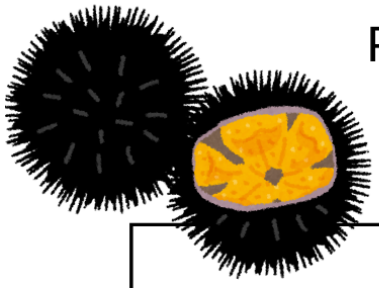
- They dig holes which fill with water, leaf litter, and microbes. The leaf carbon goes into the ground instead of the atmosphere.

How will YOU be a climate hero?? Draw a picture or write words that you can do.

Name _____

Sea Urchins

Color the boxes that are a true about sea urchins.
Place an X in the boxes that are false.
Add your own fact to the empty box.

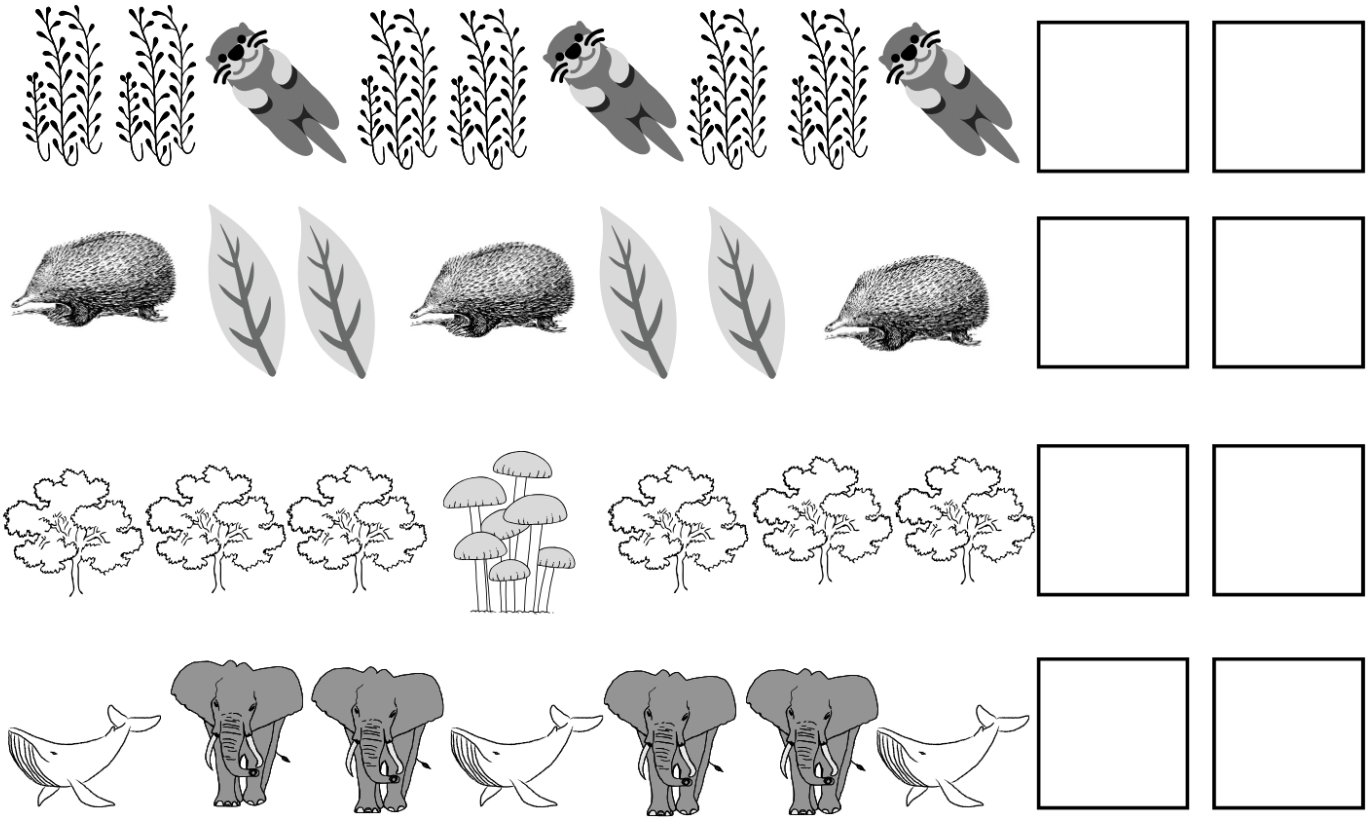


plant	big appetite	good sense of smell
bright colors	5 teeth	small size
powerful jaws		dull colors
ocean habitat	large size	important
good vision	powerful claws	animal

Name: _____

Patterns

Complete the patterns.



Create your own patterns.

Name: _____

✓	Great Whale Project To-Do List
	My great whale: _____
	3 sources for my great whale are 1.
	2.
	3.
	This whale is different than other great whales because
	10 interesting facts about my great whale are
	1.
	2.
	3.
	4.
	5.
	6.
	7.
	8.
	9.
	10.
	My diagram includes
	A title telling the kind of great whale I chose
	My name
	My drawing of the great whale I chose
	My 6 (or more) favorite and interesting facts about my great whale
	Some of my favorite facts tell how my great whale is unique

Name: _____

Context Clues

Find 3 unfamiliar words from the book and write them in the spaces below with their page numbers. Then use context clues to figure out the meaning of the word.

page #

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