

ECOSYSTEM
SERIES

A CORAL REEF ECOSYSTEM

Who Needs a REEF?

KAREN PATKAU

TEACHER'S GUIDE

ALIGNS WITH COMMON CORE STATE STANDARDS



TUNDRA BOOKS

Dear Educator

Who Needs a Reef? A Coral Reef Ecosystem introduces students to the wondrous world of the coral reef. Award-winning author and illustrator Karen Patkau uses striking illustrations and informative text to teach young readers about this unique and complex ecosystem.

Who Needs a Reef? can be used in the classroom in a number of ways, including:

- As a way to explore conceptual and thematic connections such as ecosystems, habitat, food chains, conservation, responsibility, connection, dependence
- As enrichment for a science and ecology unit
- As a whole class read aloud or for independent reading and/or research

The activity guide includes a variety of discussion questions, whole class, small group and independent activities and prompts to elicit a meaningful understanding of the text for children ranging in age from seven to ten years. The suggested activities can be adapted to suit the needs of your students. Where applicable, activities have been aligned with Common Core State Standards.

About the Book

Colorful coral reefs, astonishing in their beauty, bustle and teem with life. *Who Needs a Reef? A Coral Reef Ecosystem* takes the reader on a magical journey through one of the earth's most important ecosystems. We discover, in breathtaking art and lyrical text, the plants and animals that flourish in its tropical conditions — from coralline algae, phytoplankton and sea grasses to hermit crabs, moon jellies, whale sharks and porcupine fish.

As part of Tundra's exciting Ecosystem Series, along with *Who Needs a Desert?*, *Who Needs an Iceberg?*, *Who Needs a Jungle?*, *Who Needs a Prairie?* and *Who Needs a Swamp?*, this book brims with captivating creatures, fact-filled notes, a useful glossary, ecological features and a comprehensive map. Each book is not only informative and beautiful, but also a call to action for all of us who care about the world in which we live!

About the Author

Karen Patkau is the award-winning author and illustrator of many books for children, including *Creatures Great and Small* and *Creatures Yesterday and Today*. Her first three books in the Ecosystem series were published to much critical acclaim. *Who Needs an Iceberg?* was a Green Book Festival Honor Book; *Who Needs a Jungle?* was chosen by the Canadian Children's Book Centre as a Best Book for Kids & Teens; and *Who Needs a Swamp?* received a Silver Birch Express nomination as well as being a Green Book Festival Honor Book. Karen Patkau lives in Toronto.



© Photo by Jane Molnar

Pre-Reading Discussion / Activities

1. Introduce/review the concept of an “ecosystem.”
2. Show the cover of *Who Needs a Reef?* to students without revealing the title. *What ecosystem does this book explore? How do you know?*
3. Review the names and locations of the continents and the bodies of water that surround them.
4. In pairs, small groups, individually or as a class, investigate students’ prior knowledge of coral reefs. Ask students to complete a Who/What/Where/When/Why/How chart with what they know. Younger students can draw a picture of what they think a coral reef looks like. As a class, brainstorm and record a list of words that come to mind when students think of coral reefs.
5. Record any questions students have about coral reefs.

Learning Activities

1. What Do You See?

- The vivid illustrations in the book enhance our understanding of the complex nature of the reef. Re-read the book and locate what is being described in the text within the illustration. Re-read the section at the end of the book about the reef’s inhabitants and challenge students to locate the living things in the illustrations.
- Assign chunks of text to individuals or pairs of students and ask them to illustrate the text. Encourage the use of bright, vivid colors and to further research any of the creatures or plant life that they are not sure about.
- Create a model of a coral polyp out of modeling clay.

(RI.3.7)



2. Creatures of the Reef

- There are many unique and fascinating living things that live on a coral reef. Select one of them and write a fictitious story with the living thing as the main character. Use the reef itself as your setting and try to incorporate as much scientific knowledge about the reef into your story as possible.

(W.3.3, W.4.3, W.5.3)

3. Where in the world?

- Examine the map of where coral reefs can be found in the world. Make a list of the parts of the world that have coral reefs. Do you think all coral reefs are the same? Why or why not?

(RI.3.1)

4. Glossary

- Select five of the terms included in the glossary to examine more closely. Carefully read and think about the definitions provided and rewrite the definitions in your own words. Use the terms in sentences that demonstrate your understanding.
- Add any other words within the book that you are unsure of to a glossary of your own making.

(RI.3.4, RI.4.4)

Learning Activities (Continued)

5. Debate

- The title of the book asks the question, who needs a reef? There is a good chance that there is not a reef nearby where you live. If this is true, why should you care about the health of coral reefs? How do human activities affect the health of reefs, even if they are far away?
- There is much debate about whether people should be permitted to visit delicate and important ecosystems such as coral reefs. There are strong arguments for and against tourism to these areas. Divide the class into two groups and assign each group the task of developing an argument for or against this.
- Ask students to write about their own opinion as to whether people should be allowed to visit coral reefs. Encourage them to use facts learned from the book to support their thinking. Younger students can draw and write a short sentence underneath.

(W.3.1, W.4.1, W.5.1)



6. Comprehension Questions

Provide the following list of questions for students to answer. Students can answer the questions in writing, pictures or orally depending on their level.

- How does a coral reef form?
- Why is there so much life on a coral reef?
- What are some of the different types of hard coral?
- What is a food chain? How does it work?
- What role does bacteria play in life cycles on the reef?
- What are ten plants and animals that can be found on a coral reef? Why do they live on a coral reef? Which one do you find to be the most interesting? Why?
- What role do coral reefs play in the protection of shorelines?
- How do coral reefs help develop natural harbors and beaches?
- In what parts of the world can you find coral reefs?
- Why are coral reefs important?

(RI.3.1, W.3.2, W.4.2, W.5.2)

Learning Activities (Continued)

7. True or False

- Indicate whether the following statements about deserts are true or false. For any of the false statements, rewrite the statement to make it true.

Catching tropical fish for aquariums is unhealthy for coral reefs.

True / False

A natural harbor is a strip of shoreline covered by sand or gravel.

True / False

When waves damage a reef, it grows back quickly.

True / False

The reef food chain starts with phytoplankton.

True / False

In a food chain, smaller animals are eaten by larger animals.

True / False

Plankton can be found in the water all the time.

True / False

A finger coral is a type of hard coral.

True / False

Coral reefs house a small number of living things.

True / False

Reefs are very colorful because of the zooxanthellae.

True / False

Reefs are found in cold, fresh water.

True / False

(RI.3.1)



9. Fill in the blanks using the words provided below.

- a) _____ passes from one living thing to another in a food chain.
- b) Waves are caused by _____, _____ and _____ .
- c) A natural _____ is the part of a body of water that is shielded by land from rough waves.
- d) If the coral dies, reef animals and plants lose _____ and _____ .
- e) The eight-armed _____ changes color and texture for camouflage.
- f) Most starfish have _____ arms growing out of a central disk.
- g) An _____ is a community of plants, animals and organisms that interact with each other and their physical environment.
- h) An animal that feeds on leftover food or plant and animal remains is called a _____ .
- i) Zooplankton feed on _____ .
- j) An animal that is hunted by another animal for food is called their _____ .

OCTOPUS

ENERGY

HARBOR

SCAVENGER

PREY

WINDS

FOOD

EARTHQUAKES

SHELTER

STORMS

FIVE

ECOSYSTEM

PHYTOPLANKTON

(RI.3.1)

Wrap-Up Discussion Questions

1. Given what you have learned about the importance of coral reefs, what are some changes that you can make in your daily life to help protect coral reefs from further danger?
2. Assign one of the living things that can be found in a coral reef listed at the end of the book to each student. Ask them to further research the creature or plant and present back what they have learned in small groups or to the class. Consider creating a class mural with each student contributing a drawing of their living thing.
3. Revisit what students recorded of what they knew about coral reefs before reading the book and their questions from the pre-reading discussion. What are three facts that the students learned about coral reefs? Were all of their questions answered? What further questions do they have to explore?
4. Read the other books in the Ecosystem series. Compare and contrast the different ecosystems.

(W.3.7, W.4.7)

PRAISE FOR the Ecosystem Series:

“Patkau introduces readers to the North American Arctic ecosystem efficiently and methodically, discussing habitat, the food chain and seasonal changes, along with the ever-important formation of the iceberg ... Her digitally composed illustrations at times offer informative scenic views, and at times, present readers with more direct scientific information. This, as well as its companion volumes *Who Needs a Swamp?* and *Who Needs a Jungle?*, offers a clear, readable introduction for budding naturalists and geographers.”

– *The Toronto Star*

“ ... Patkau offers a series of vibrant scenes ... striking illustrations. The text both interprets the visual content ... and offers paragraphs of diverse facts.”

– *Booklist*

Links

<http://www.patkauillustration.com/>

Appendix: Common Core State Standard

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| CCSS.ELA-Literacy.RI.3.1 | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. |
| CCSS.ELA-Literacy.RI.3.4 | Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. |
| CCSS.ELA-Literacy.RI.3.7 | 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). |
| CCSS.ELA-Literacy.RI.4.4 | Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. |
| CCSS.ELA-Literacy.W.3.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons. |
| CCSS.ELA-Literacy.W.3.2 | Write informative/explanatory texts to examine a topic and convey ideas and information clearly. |
| CCSS.ELA-Literacy.W.3.3 | Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. |
| CCSS.ELA-Literacy.W.3.7 | Conduct short research projects that build knowledge about a topic. |
| CCSS.ELA-Literacy.W.4.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons and information. |
| CCSS.ELA-Literacy.W.4.2 | Write informative/explanatory texts to examine a topic and convey ideas and information clearly. |
| CCSS.ELA-Literacy.W.4.3 | Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. |
| CCSS.ELA-Literacy.W.4.7 | Conduct short research projects that build knowledge through investigation of different aspects of a topic. |
| CCSS.ELA-Literacy.W.5.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons and information. |
| CCSS.ELA-Literacy.W.5.2 | Write informative/explanatory texts to examine a topic and convey ideas and information clearly. |
| CCSS.ELA-Literacy.W.5.3 | Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. |