



Teacher's Guide

A free downloadable guide to *Amazing Animal Adventures in Rivers* available at www.fitzhenry.ca

Teachers have permission from the publisher to make copies of this guide for personal classroom use, personal reference, and student use.



Teacher's Guide

Going Wild: Amazing Animal Adventures In Rivers

The Book

Going Wild: Amazing Animal Adventures In Rivers offers children an exceptional and engaging view at some of the most interesting and engaging water environments on this planet—rivers. Written by Brian Keating, one of Canada's foremost naturalists, the book teaches children about the environment, diverse water resources, wildlife, and conservation efforts for river landscapes. Brian's own stunning photographs accompany his lively and entertaining stories, detailing some of his most exciting paddling and wildlife-watching escapades. In the book, Brian takes young readers on a journey as he discovers:

- Calving glaciers and spawning salmon along the Tatshenshini River and Alsek Lake in the Yukon
- Playful “water dogs” or giant river otters in Guyana's Rupununi River, also known as the black waters of South America
- Bull elephants bathing in waterholes they dig themselves in southern Africa
- A paddle can save a rattlesnake from the chilly waters of the South Saskatchewan River
- How to patch a canoe that's been bitten by a hippo in Zimbabwe's Hippo Valley of Mupata Gorge

The Author

Brian Keating is a keen naturalist, avid outdoorsman, world traveler, intrepid adventurer, and extraordinary spokesperson for the world's wild places and the creatures that inhabit them. His first job with the Calgary Zoo in 1981 was in their education program. Now Brian is head of the zoo's Conservation Outreach Department, such as the Wechiau Hippo Sanctuary in Ghana, West Africa, and the nature-based eco-tour program that he started in 1983.

Keating has been a weekly guest on local CBC Radio for nearly two decades and has been featured bi-weekly on the Discovery Channel for the past seven years. In addition to his full-time job at the zoo, Keating is an adjunct assistant professor of anthropology at the University of Calgary, a pilot, a scuba diver, and a mountaineer.

The Teacher's Guide

The *Going Wild: Amazing Animal Adventures In Rivers Teacher's Guide* is an instructor resource that correlates to *Going Wild: Animal Adventures in Rivers*. The activities in this guide can be used individually or as a series of lessons, depending on the requirements of the teacher.

Activities are drawn from the science curricula of several provinces in Canada for grades four to eight, with particular emphasis on the units focusing on: Habitats and Communities (Grade 4), Wetland Ecosystems (Grade 5), Diversity of Living Things (Grade 6), Interactions with Ecosystems (Grade 7), and Freshwater and Saltwater Ecosystems (Grade 8). Students will be encouraged to analyze and interpret, perform and record, initiate and plan, and practice communication and teamwork skills. They will create models; discuss; debate; research; plan; and execute presentations; and initiate, plan, and create examples of conservation organizations.

Humanities connections: While all the activities draw from science curricula, activities one, three, and six also have strong social studies and language arts connections. Activity three draws on curricula that focus on the impact of the environment on human communities and cultures and local governments. The extended connections these activities have with humanities curricula make the book an excellent cross-disciplinary tool in any classroom. At the beginning of each activity is a section outlining skills, as well as science and humanities focuses, for the activity. At the end of each activity **One Step Further** allows teachers to have a larger discussion on each of the activities and topics and make a stronger connection to humanities and science curricula.



We found this tired and cold rattlesnake attempting to swim across the river. I carefully scooped him up on my paddle and took him to shore. Because he was so cold, he was easy to transport and photograph.

Activity 1: Research a River

Skills focus: communication and teamwork; initiating and planning; analyzing and interpreting; exploration and investigation

Science focus: interdependence of species; environmental stability; ecosystem connections; biodiversity; food webs

Break the classroom into groups with five students in each group. Ask students to choose one of the major rivers that Brian Keating visited in *Amazing Animal Adventures in Rivers*:

Columbia River, British Columbia

Zambezi River, Zimbabwe and Zambia

Tatshenshini River, Yukon Territory

South Saskatchewan River, Alberta and Saskatchewan

Rupununi River, Guyana

Kootenay River, British Columbia

Black Volta River, Ghana



Hippos can walk on river and lake bottoms, creating pathways that help to keep waterways moving. They have webbed feet that are great for both river-bottom walks and for supporting their big bodies on land.

Ask each student in the group to choose one of the tasks below:

- Draw a map of the river. Mark where the river starts and where it ends. Include the boundaries of the countries that the river flows through.
- Create a list of the birds, animals, and all the wildlife that Brian Keating saw when he visited this river. Do extra research and find out what other kinds of wildlife live near the river.
- Write a paragraph or two on the history of the river. Research and answer the questions: Did a famous explorer ever travel the river to

- record lands that had not been known by Europeans before? Did the river ever flood and cause chaos to the surrounding area?
- Choose a spot along the river and create a food web that illustrates the wildlife that exists in that ecosystem.
 - Write a paragraph or two on the conservation efforts to protect the river and the species that live near it. Research and answer the questions: Are there current conservation efforts in place to protect the river? If yes, what are they? If no, what problems could arise in the future? And what could people do to ensure the river and its dependents remain strong?

Once the students have completed their tasks, have the groups present to the rest of the class.

One Step Further:

Ensure the student who is presenting information on conservation goes last. This could lead to a class discussion. Have all students participate in brainstorming ideas on what they could do to help keep rivers clean and their riparian ecosystems strong.

Activity 2: Postcards from Around the World

Skills focus: analyzing and interpreting; performing and recording

Science focus: human impacts on the environment; personal and public decisions that impact the environment

Brian Keating mentions a number of animals he's seen in *Amazing Animal Adventures In Rivers* are endangered, such as burrowing owls. Other animals still have large populations but they are killed by humans for trophies, such as elephants for their tusks.

Have each student choose an animal that Brian describes in the book. Cut sheets of Bristol board into postcard-size pieces and hand them out to the students. On one side, students should draw their animal of choice and the environment in which Brian saw it. Ensure the students don't just draw the animal, but that they include prairie grasses if it's a rattlesnake, baobab trees if it's a baboon, marshland for a heron, etc.



We watched this elephant along the banks of the Zambezi for hours. He would rear up on his back legs and pull branches down with his trunk so he could eat the leaves. After he moved off, antelope would come in and browse on the vegetation left by the elephant.

Have students do research on their animal to write on the opposite side of the postcard. Pair the students up and ask them to write their postcard to the other student (the students of the pair must each choose a different animal). They should describe everything they can about the animal they've drawn and include the following information:

- Is the animal endangered?
- Does the animal have enemies or predators?
- What does it eat?
- Where does it live?
- What, if any, "home" does it build to live in?

Have the students exchange postcards and read about the other animal.

One Step Further:

Let students continue to trade their postcards, so they can read about a number of animals. Once they're finished, ask students to tell you the names of all the endangered animals. Write them down on the blackboard. Ask students if they know of any other animals that are endangered and add to the list. Ask students what society or the government could do to save and help endangered animals. Ask students what they could do to save or help endangered animals themselves.

Activity 3: Time for Debate

Skills focus: communication and teamwork; initiating and planning; analyzing and interpreting; performing and recording

Science focus: human impacts on the environment; human wants and needs impacting the environment; personal and public decisions that impact the environment

Humanities focus: impact of environment on human communities and cultures; local governments

Ask students to read “The True King of Beasts,” a story in which Brian Keating describes the problems of poaching and how elephants are killed for their tusks. He explains how laws that governments have put in place have drastically reduced the number of elephants killed. However, some poachers and local people believe that if there are too many elephants and that they destroy the environment, eating and stomping on trees and farmland. Poachers also might not take money to kill elephants if they could earn money at a more honorable job. Explain to students that even though a situation may be clearly wrong, there are often two ways to look at a situation.

Divide the class into three groups. One group should represent the Zimbabwean government, who has put laws in place to protect elephants. The second group will represent the poachers, who can argue they need a way to earn money or that they are farmers who have had fields destroyed by elephants. The third group will be “jury”; they will decide which group made the stronger argument and “pass a law” accordingly.

Before students start to prepare their arguments, have the whole class discuss the topic. Discuss the benefits and drawbacks of saving elephant populations. From that discussion, the students can come up with a list of points to discuss representing their roles.

As the government and poacher groups present their points, the student jury should award and record points to each group according to their arguments. The jury should then discuss the debate, tally up the points for each group, and then pass a law according to which side made a stronger debate.



Although the Ivory Ban helped to stop poaching in much of Africa, poaching elephants for ivory continues today in countries like Zimbabwe. African elephants are an endangered species.

One Step Further:

Killing valuable animals doesn't just happen across the globe. It happens in Canada as well, in such cases as the grizzly bear hunt. The same debate process could be used to discuss the more local grizzly bear debate in Canada and the northern United States.

Activity 4: Melting Glaciers

Skills focus: performing and recording; communication and teamwork; analyzing and interpreting

Science focus: environmental stability; ecosystem connections; affects of human activities

Ask students to read “Iceberg Ice Cream on the Tatshenshini” to get a feel for the North and to find out more about Brian’s first-hand experience with glaciers. Next, students will create a glacier of their own to better understand how it moves sediment.



As a glacier grinds its way over rocks, it pulverizes the rock underneath into a flourlike substance called “rock flour.” Because of the density of rock flour in the Tatshenshini River, the water is virtually white.

Materials required

- A milk carton (1 liter size)
- A wood plank (approximately 12 feet long by 1 foot wide, and it should be relatively smooth)
- Sand
- Rocks
- Gravel
- 2 bricks

Procedure

(You could prepare the first few steps ahead of time, or you could divide the class into groups and have each group responsible for their own experiment.)

1. Remove one side from the milk carton
2. Fill one third of the carton with a mix of sand, rocks, gravel and water. Freeze it.
3. Once frozen, add another third of the same mixture and freeze again.
4. Repeat the step a third time, and freeze until solid.
5. Lay out a large plastic sheet (or garbage bags), then place the plank on top at a 20 degree angle (place a brick or two under one end of the plank to get the angle required).
6. Spread gravel along the plank.
7. Remove the frozen block from the milk carton and place it at the top of the plank.
8. Once the ice block starts to move, have students observe the movement and the carving it has created with the gravel.
9. Have students track the block of ice as it continues to move and melt. Ask students to pay attention to a number of factors:
 - a. Is it moving all the sediment out of the way?
 - b. What is being pushed to the side?
 - c. What is being pushed down the plank?
 - d. What is being “run over” by the block?
 - e. Why isn’t the same thing happening to all pieces of sediment?
10. Have students write down the types of formations created by the ice block. They can illustrate it as well.

One Step Further:

Ask students if they’ve ever seen or visited a glacier. Ask them to share their stories. There have also been many stories in the news about melting and shrinking glaciers due to global warming. Bring in some of the news stories to share with students and

create a discussion around them. What do melting glaciers mean to the planet? To the students specifically? How can students get involved?

Activity 5: Changing Wetland Ecosystems

Skills focus: initiating and planning; analyzing and interpreting; recording

Science focus: comparing biotic and abiotic ecosystems; wetland ecosystems; biodiversity; habitats and communities

Wetland ecosystems are a vital part of North America’s landscape; they are homes to thousands of species of birds, amphibians, fish, and insects. Ask students to read Brian Keating’s story “My Dream Job.” In that story, he describes how he educated visitors to the Creston, BC, region on wetlands, marshlands, and the wildlife that called those areas home. Students will create their own pond ecosystem, micro versions of the ones that Brian studied, and then they will change their ecosystems into wetland.



Owls, like this great horned owl, eat, and then a few hours later they cough up a pellet that contains the skull and the bones of whatever has been eaten. Nothing satisfies me more than finding an owl pellet in the woods and opening it up to see what the owl has had for a midnight snack!

Materials

- large, empty jars

- soil
- water
- small aquatic plants
- birdseed

Each student should bring a large jar to school (bring extras in case some students don't have access to large, empty jars). They should then fill the bottom of the jar with 5 cm of soil and 7.5 cm of water. The jars should then be placed by a window or under a grow light overnight.

Collect a number of small aquatic plants, and place one in each of the jars. Have students draw illustrations of the inside of their small ecosystems and label the biotic and abiotic components inside. Then add three or four birdseeds to each jar. (They will germinate and rot.)

Continue to add birdseeds on a daily basis after all the water has been absorbed or evaporated, until the seeds start to grow and the aquatic plant dies. At that point, have students illustrate their ecosystem; they should label the biotic and abiotic components again. Have them make a list of the changes.

Start a discussion around the changes that took place in their mini ecosystems. Ask the students what type of ecosystem their first illustration represented (a pond). They labeled the biotic and abiotic components in their system, but what would they find in a real pond ecosystem (fish, insects, frogs, rocks)? What type of ecosystem did their pond become in the second illustration (wetland)? And what other types of biotic and abiotic components live in a real wetland ecosystem (birds, moose, rocks, cattails, reed grasses)?

One Step Further:

Ask students if any of them live around pond or wetland ecosystem, or if they have them in their neighborhoods. Ask them to describe the abiotic and biotic components in those systems. Take a short field trip to a pond or wetland if possible or discuss local conservation groups trying to save wetlands.

Activity 6: Young and Mature Rivers

Skills focus: performing and recording; communication and teamwork; analyzing and interpreting

Science focus: environmental stability; effects of erosion; interactions with ecosystems; fresh water systems

Humanities focus: impact of environment on human communities

Rivers change as they mature. Young rivers flow straight and quickly. As they mature, a river will meander more; as curves begin to form, water along the inside slows down and deposits sediment (slowing it even more and creating more of a curve). Water flowing around the outside of a curve runs faster, as a result the water erodes the riverbank.

Characteristics of a young river include: they have fast flow and straight, steep banks; they carry material that's larger; and they erode banks quickly. Mature rivers flow slower; they wind and meander and have gently sloping banks due to erosion and deposits; and they carry material of smaller size so they are more full of sediment. Ask students to create a "river radar" to better understand the flow of rivers.



One of southern Alberta's rivers winds through the landscape at a leisurely pace.

Materials

- cardboard
- scissors
- pencil or narrow, round stick

Ask students to:

1. Cut a circle out of cardboard. The diameter should be about 16 cm across.

2. Number the circle outwards from the inside, 1 to 4, and draw four circles between the numbers.
3. Poke a hole in the middle of the circle and put a pencil or narrow, round stick through it.
4. Spin the circle and observe which numbers appear to be moving faster than others. (The outside ones appear to move faster.)

Ask students to relate these observations to a flowing river. Ask them to draw an illustration of a meandering river and label it according to the following questions:

- Where does a river flow faster?
- Where does a river erode the land it flows by?
- Where does a river flow more slowly?
- Where does it deposit sediment?

Further questions for discussion:

How are you able to tell if a river is young or mature?

If you owned property on a river, would it be better to own it on the inside portion of a curve or the outside portion?

Where would it be better to build a house?

One Step Further:

In Activity 1, there is a list of the rivers Brian Keating has visited and students drew maps of them. Have students return to those maps and discuss whether they are young or mature rivers.

In case this activity is done before Activity 1, the list of rivers he visited is:

Columbia River, British Columbia

Zambezi River, Zimbabwe and Zambia

Tatshenshini River, Yukon Territory

South Saskatchewan River, Alberta and Saskatchewan

Rupununi River, Guyana

Kootenay River, British Columbia

Black Volta River, Ghana