



Extreme Environments

LIVING ON THE EDGE

By Amy Tilmont and Jeff Garside with Mark Stewart

Series Objectives

The **SECOND NATURE** series equips students with the tools needed to understand the complex relationships between human activity and the natural world. Each book explores a big-picture topic by assembling smaller, more intimate snapshots—all taken through the “lens” of environmental science. The words and pictures in this book have been carefully crafted to engage young minds, and to serve as a launching pad for further learning.

In This Book

Extreme Environments examines “life on the edge” from every scientific angle. The goal is to promote integrated thinking on the part of students and to underscore the idea that these environments are closer to home than they realize—both literally and figuratively. From a teaching perspective, *Extreme Environments* offers an opportunity to initiate classroom discussion that touches on various aspects of climate science as they relate to geography, culture and technology. Ask your students the right questions and the rest should take care of itself.

Classroom Plan

Chapter One: *What’s the Problem?*

Extreme environments are places where conditions make survival for most organisms impossible. This chapter explores the extremes of hot and cold, wet and dry, and places prone to both natural and manmade catastrophes.

Ask your students to recall the most extreme place they have visited and imagine what aspects of their lives would be the most different if they called that place home.

Note: *On the World View spread, ask your students what the hottest and coldest places on each continent have in common. The hot spots are closer to the equator than the cold spots, which are closer to the poles. What’s interesting is that in many places, the two extremes are not all that far apart.*

Chapter Two: *How We Got Here*

One of the greatest teaching challenges is getting young minds to embrace history. In this chapter, history has a specific end point—today’s extreme environments—and is presented as straight-line cause-and-effect. Students are given the basic science behind the *Why?* and *How?* of extreme environments.

This chapter offers a wonderful opportunity to use everyone’s favorite topic—Dinosaurs!—to show how extreme environments can have a profound effect on who “wins” the evolutionary sweepstakes. Kids know that a cosmic impact killed off the dinosaurs, but do they understand how this opened the door to mammals?

Ask your students to describe life on earth had the killer asteroid *missed* earth 65 million years ago. Would dinosaurs have built complex societies? Would mammals have used their intelligence and flexibility to find a way to “win” anyway? The fun and fantastic responses you elicit underscore for students the enormous implications of sudden and dramatic environmental changes.

Chapter Three: *If We Do Nothing*

In many respects, young minds are programmed not to leap into complex problem-solving. Kids tend to think that if they ignore a critical issue, somehow it will go away. Some adults are guilty of this, too! This chapter takes a peek into the potential outcomes if humans don’t change the way they interact with the environment.

Here is an opportunity for your students to gain a more sophisticated understanding of the process we refer to as Global Warming. Most kids—in fact, most adults—assume that humans will be living in a hotter world down the road. In some climate models, however, Global Warming leads to *plummeting* temperatures. This chapter helps you explain the workings of the ocean conveyor belt that dictates climate and temperatures around the globe.

Ask your students to describe life in your town if every day were 20 degrees warmer...or 20 degrees cooler. How would this affect the way they dress, their outdoor activities and the food they eat?

Chapter Four: *Bright Ideas*

It takes big ideas to solve big problems. Or does it? Some of the solutions to the challenges of extreme environments are elegant in their simplicity. This chapter drives home the point that bright ideas can come from anyone, anywhere at any time. So often the solution to an environmental problem makes you say, “Wow, why didn’t I think of that?” Well, there are plenty of problems still waiting for bright, motivated young people to solve.

Ask your students to list the greatest obstacles to living in the most extreme environment of all—outer space. Air. Water. Food. Gravity. Waste. Power. These challenges will exist whether humans are living in a space station or colonizing a distant planet. Your students may surprise you by coming up with intriguing problems...and clever solutions.

Chapter Five: *Trailblazers*

This chapter offers short profiles on people who are making a difference in the world. They come from all walks of life and have different types of expertise. To illustrate how anyone can rise to these challenges, list different types of “jobs” (sea captain, mountain climber, teacher...) and **ask your students** how people in these fields might help humans solve the challenges of extreme environments.

Chapter Six: *Field tested*

This chapter looks at how people concerned with the environment go out and get things done. At Antarctic research facilities, scientists commit a year or more of their lives to live and work in earth’s most extreme environment. **Ask your students** to make a list of five things they would bring from home if they had to go on a one-year research mission. Here’s the catch—everything must fit into a shoebox!

Chapter Seven: *Career Opportunities*

This chapter looks at the many jobs connected to extreme environments. Most kids tend to think of careers as something you *are*, rather than something you *do*. That’s no way to pick a career! You can begin changing the way they think. **Ask your students** how they would like to interact with the natural world—and then brainstorm all the different jobs that would lead to that interaction. Needless to say, this is a nice place to point out the importance of a good education and a lifelong commitment to learning.

Chapter Eight: *Expert Opinions*

Children don’t often deal with standalone quotes in the books they read. Here they have some context—the words in this spread relate back to ideas covered earlier in the book. For you as an educator to understand what has made an impression, **ask your students** to “vote” on their favorite quote. You may find the results illuminating.

Chapter Nine: *What Can I Do?*

This chapter offers ideas on how students can become personally involved in extreme environments. Class trips to the equator and Arctic are probably off the table. However, communicating with kids who live in or near these extreme environments is definitely possible. If letter-writing is part of your curriculum—or if it’s simply a skill you want to promote—**ask your students** whether they would like to exchange notes with someone in another part of the world. Contact some of the pen pal groups on the Internet and see if there is a program that is right for your class. Nothing will have a greater impact on your students than building a bond with someone who is literally living on the edge.