

TO LOOK CLOSELY

SCIENCE AND LITERACY IN THE NATURAL WORLD

LAURIE RUBIN



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Why Nature Study?

For many years, during the last two weeks in August, you would find me setting up my classroom—organizing areas for books, art supplies, and blocks; making labels for cubbies and coat hooks; writing an introductory letter to parents; reviewing first-week plans; and attending to a seemingly endless to-do list. Then, on Labor Day weekend, you would find me searching through fields and roadsides, turning over telltale, chewed-up milkweed leaves, hoping to stumble on a fat green monarch caterpillar beneath. This ritual hunt launched my very first year of teaching when my mentor and first-grade colleague informed me that I had to start the school year with monarch caterpillars in my room. It was the best piece of advice she ever gave me. I learned early on that children and the natural world are a winning combination.

Year after year my students and I marveled as each J-shaped caterpillar miraculously morphed into its chrysalis and then, two weeks later, the same green gem turned clear and hatched an orange and black monarch butterfly. I was always on the lookout for new patches of milkweed to enhance my autumnal supply of caterpillars. Then, unexpectedly, there came a year with no monarchs, and I panicked. How could I coax my new crop of second graders into a community of engaged, curious learners without my beloved caterpillars?

With only seven days before school would begin, I sat down in my classroom, my planning book open in front of me, staring out the window and waiting for inspiration. I considered the tanks filled with turtles and frogs, a permanent installation in the classroom across the hall. I remembered the aquarium a colleague set up the previous year to study water flow. I stepped out into the small woods just twenty feet from my classroom window and stood in front of the shale streambed at the edge of the school property where a small trickle of water was flowing. That night I scoured my professional collection of books on science education and hit the jackpot—an essay about a yearlong stream study. I could feel the adrenalin rush as I decided to give stream study a try, hoping to find a scientist/ecologist or two among my students' parents to help me. With nothing more than a general idea that my students would observe changes in the stream as well as the plant and animal life surrounding it, I reasoned that as long as I could engage my students in the natural world, I would figure out the details later. I trusted that my students' engagement, curiosity, wonder, and connection to nature would show me the way and inform my teaching.

For the next two years I experimented with different approaches, trying to identify the important concepts I wanted to teach via nature and outdoor exploration. I knew there was a lot of fine-tuning ahead of me, but, in the meantime, I was learning a great deal about aquatic insects, geology, and environmental issues from volunteer parents, and I was encouraged by the enthusiasm of my students. It turned out some of them were already seasoned naturalists, adept at catching salamanders and crayfish, knowing exactly where to find them.

In retrospect, it is a logical progression that in July 2004 I enroll in a nature journaling class at the University of New Hampshire in Durham, my fourth summer attending the Literacy Institutes for teachers. This particular year I drive the seven-plus hours from Ithaca to Durham chuckling over the prospect of earning graduate credit to wander about outdoors, drawing and writing observations in a blank book. I am not sure how this class will inform my teaching, but I look forward to using my brand-new set of Prismacolor pencils and improving my drawing skills.

Kate Gardoqui, our talented and passionate instructor, has already sent us the syllabus. As soon I arrive, I begin scoping out my "sit spot." We are to visit this place every day to observe and connect with the natural world. By the first day of class, with convenience in mind, I choose a small stream

just off the path that I will walk several times a day. By the end of the first day, I am hooked.

Over the next two weeks, I immerse myself in nature study. I learn that animals stay near the edges when they are eating so they can quickly elude a predator. I observe a water strider long enough to discover that it moves by stroking with its middle legs and I recognize that there are more flowers on the *southern* side of a goldenrain tree. I return to my sit spot a dozen times until I feel like I am returning to visit an old friend. Somewhere in the middle of choosing a final class project, I grasp the obvious. I will add nature journaling to our stream study.

Shortly after my return from UNH, I am vacationing in the Pacific Northwest where my nature journal becomes my most treasured companion. Every outing, every hike suddenly requires an extra hour or two. On the Naches Trail around Mt. Rainier, I need to write about the two squirrels in residence at a popular lookout, lobbying for lunch scraps. I am compelled to draw the Indian paintbrush so I will always remember it. Back in Seattle, I borrow my friend's field guides and identify the rufous hummingbird I have been watching for an hour in his front yard. I slowly give myself over to a passion for the natural world, a passion that will change my life and the lives of my students.

It is during the next year that I slowly begin to identify myself as a naturalist, meaning for me, a person drawn to the natural world, eager to identify the flora and fauna around her. I fill up three small journals with drawings and observations. I become a birdwatcher who never travels anywhere without her binoculars. I start collecting Mary Oliver's nature poems and write one of my own trying to capture my profound attraction to birds. I memorize John Moffitt's *To Look at Anything* and tape up a copy in my bathroom for all my friends and family members to read. I beam when a student shows me an entry in the nature journal he is keeping at home. I laugh with delight when a parent excitedly points out a downy woodpecker at a class picnic. I become the nature maven in my school, receiving gifts of bones, feathers, and "sightings" from students and teachers alike. I am convinced that encouraging my students to observe and connect to the natural world is the most valuable set of lifelong lessons I can deliver.

Over time nature study becomes the heart and soul of my teaching. Over time nature study not only helps me create an integrated curriculum throughout the day but also informs and enhances my students' learning

in science, math, and language arts. Over time nature study teaches my students and me how to be critical thinkers.



When I started teaching in 1987 the whole language movement was in full swing. It was an exciting time and a great fit for me. My personal language arts skills made a giant leap when I began to teach reading and writing. Writing for real purposes and mimicking the process of published authors jump-started my own writing. The emphasis on reading for meaning, and later on metacognition, changed the way I read books and transformed the discussions in my book club.

Although I was excited and thrilled to enter the teaching profession in the midst of such a reflective examination of language arts teaching practice, not all teachers felt the same way. It did not take long for seasoned teachers, those teaching for twenty years or more, to shake their heads knowingly and proclaim, “What goes around, comes around. Wait a few years and we’ll be back to where we were in the early seventies.” I remember a fourth-grade teacher stopping by my classroom to confide, “Just wait. In ten years the pendulum will swing back again. One hundred eighty.” I listened with the confused, overwhelmed, but also partly arrogant ears of a first-year teacher and opted for the meaningful whole language text of the New Zealand readers over the Modern Curriculum phonics-based readers with contrived sentences like “The cat and the rat sat on the mat.”

It was also a time when my colleagues and mentors valued integrated learning. In our school it was common for teachers to teach by theme. For example, over the course of one year my first-grade class investigated Families, Simple Machines, Thailand, and Water Animals. Our learning in all content areas—math, language arts, science, and social studies—revolved around one of these central themes. Even the music, art, gym, and library teachers were willing to explore ways to incorporate our themes into their required curricula.

Then, as predicted by my more senior colleagues, in 2001 the passage of the No Child Left Behind Act did, in fact, begin the trajectory back toward an emphasis on teaching isolated skills. With the best of intentions, Republicans and Democrats came together to pass legislation they believed would improve individual outcomes in education by setting high standards and establishing measurable goals. However, despite pressures from the

No Child Left Behind Act, and with many of my colleagues returning to skills-based teaching, I believed that an integrated learning experience could actually take children beyond the minimum skill levels needed for standardized tests.

Today my belief in an integrated learning experience for my students remains resolute. I am confident that such an experience can be developed within the context of the ever-shifting state and federal learning standards. I am convinced that nature study is *the* child-centered program that can integrate critical thinking skills in science, mathematics, and language arts.

If you are a preservice or inservice teacher reading this book, I hope to convince you to place nature study at the core of your curriculum, even if you, like me, might not identify yourself at first as a scientist or scientific thinker. If you are a school administrator, I hope to persuade you to walk around your school and envision students engaged in an outdoor curriculum that leads to critical thinking and future stewardship of our environment. If you are a parent or grandparent, I hope you will be inspired to go out into the natural world with your children and grandchildren, find a sit spot, and create memories together that will last a lifetime.

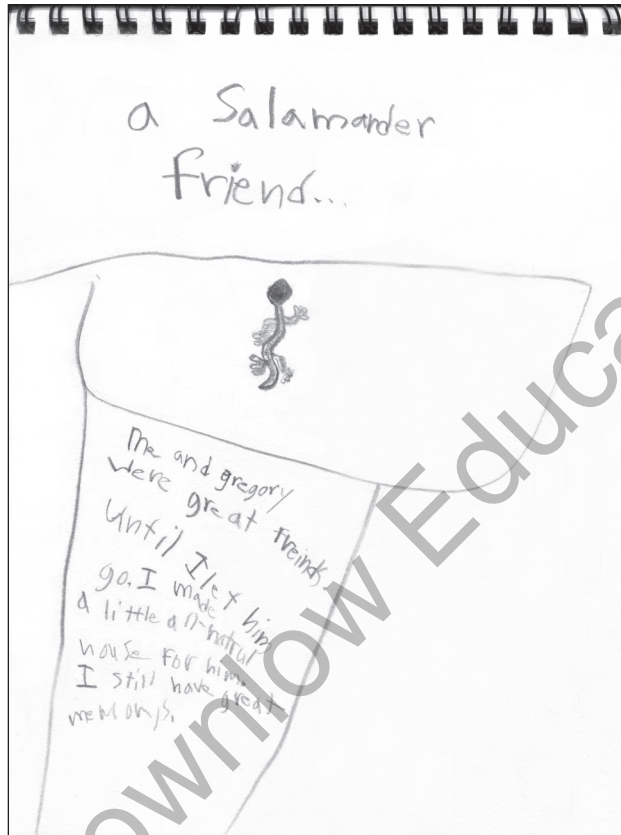


To Look Closely: Science and Literacy in the Natural World documents my experience with nature study and the development of my curriculum. It follows my class of second graders from September through June as they visit a woodland stream.

Chapter 1, “Ten Tips for Getting Started on Nature Study,” outlines the nuts and bolts necessary to plan for a year of nature study. You will not only find out about the practical considerations of time, management, equipment, and supervision, but also consider how to boost your comfort level in the out-of-doors and prepare your students to be naturalists.

Chapter 2, “Moments of Science,” demonstrates how recognizing moments of science sets a tone of inquiry-based thinking in the classroom for every content area, throughout the day and throughout the school year. When you use moments of science as a convention in your teaching, you will understand, from the inside out, what it means to have an inquiry-based science curriculum. As you learn to notice moments of science, your students will start responding to the world around them in increasingly perceptive ways and thinking together as a community of scientists. You

FIGURE 1 - A student remembers a friend he made in the natural world.



will understand the different kinds of student moments, how you can introduce and integrate moments of science into your teaching practice, and how to encourage critical thinking skills at home.

Chapters 3, 4, and 5, “A Year at the Stream—Autumn, Winter, Spring,” describe a year of nature study in upstate New York and show what it looks and sounds like when a class of twenty-one second graders visits a small stream in the woods behind a suburban elementary school. Following each of the thirteen stream visits, you will find my reflections about our class discussions, activities, and learning experiences. As you read, I hope you will ponder my observations made over time about group dynamics and individual students. My personal nature journal entries will show you my attempts to practice the critical thinking I am asking of my students. Finally, you will read samples of student journal entries, collected over seven years of nature study, which show a variety of student abilities (see Figure 1).

Chapter 6, “Literacy Through Nature Study—Reading,” demonstrates how the natural world provides our students with multiple opportunities to develop the language of metacognition. As children become naturalists, as they strive to understand the world they live in, as they learn to observe, ask questions, make hypotheses, and look for evidence in the natural world, they are also rehearsing essential reading comprehension strategies that will enhance their literary lives. You will learn how to use experiences in the natural world to teach your students how to make connections and inferences, ask questions, visualize, and determine importance when they read. You will appreciate how critical thinking skills extend from moments of science to moments of language that celebrate questions and observations about words, text, and writing craft.

Chapter 7, “Literacy Through Nature Study—Writing,” considers how nature study motivates a variety of writing genres. You will discover how shared experiences in the natural world inspire students to write throughout the school year. Stream visits and bird study coupled with student sharing of rocks, feathers, bones, and creatures in the classroom maintain a focus toward nature and the environment, providing a ready-made treasure chest of writing topics. You will examine student work in narrative, poetic, and nonnarrative genres, including nature journals.

Chapter 8, “Creating Stewards of the Natural World,” illustrates how a focus on nature study nurtures “green” citizens who grow up to value and protect the natural environment. You will meet students who refine their understanding of the natural world inside the classroom and at home, who pursue a particular inquiry over time, and who are inspired by the opportunity for environmental activism.

In the appendixes, you will find examples of student writing—narrative and poetry—that represent a range of ability. There is also a list of nature-based websites for students to use independently, for teachers to gain background knowledge, or for whole-class instruction. The references offer a quick guide to the picture books that I use for read-alouds in my classroom.

After joining us at the stream and listening in to our conversations in the classroom, I hope you will agree with me that nature study is not an enrichment activity, but instead the essential key to fostering creative, inquiry-based learning throughout the year, extended to all curricular areas. I hope you will have many students like the ones you meet in this book—Sophie, Samantha, Nicholas, Jocelyn, Daniel, and Sydney, to name

a few—to inspire and encourage you to look outside and embrace a year of nature study.

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