Be a Naturalist

Written by Jennifer Watts
Coauthored by Leah Adams
Be a Naturalist

Written and Designed by Jennifer Watts
Co-authored and Edited by Leah Adams
Cover Design by Dan Adams

Cover Elements: Naturalist - Scientific Design Set
copyright Beauty Drops via Creative Market

A special thank you to our family and friends for your support, encouragement, and assistance as we endeavored to bring our dream to life.

We hope our love of science and nature positively impacts all users of Science Through Nature. Families are granted permission to print and/or copy the program for use by their children. All other reproduction and distribution is prohibited as stated below.

Copyright © 2019 Science Through Nature, LLC

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law.
# Table of Contents

Welcome to Science Through Nature .................................................................................. 5

Features ........................................................................................................................... 5
About ................................................................................................................................. 6
Schedule ........................................................................................................................... 8
Parent Resources ............................................................................................................. 9
Map of Hawk Valley Nature Preserve .............................................................................. 11

Quest 1: Let's Explore .................................................................................................... 12
PreQuest Prep .................................................................................................................. 13
Resources ......................................................................................................................... 14
A Note to Nature Explorers ............................................................................................. 15
Adventures ....................................................................................................................... 20
Meet a Naturalist ............................................................................................................. 24

Quest 2: Nature Detectives ............................................................................................ 29
PreQuest Prep .................................................................................................................. 30
Resources ......................................................................................................................... 31
A Note to Nature Explorers ............................................................................................. 32
Adventures ....................................................................................................................... 38
Nature Art ......................................................................................................................... 45
Adventure Sheets ............................................................................................................ 47

Quest 3: Super Senses .................................................................................................... 49
PreQuest Prep .................................................................................................................. 50
Resources ......................................................................................................................... 51
A Note to Nature Explorers ............................................................................................. 52
Adventures ....................................................................................................................... 57
Meet a Naturalist ............................................................................................................. 63
Adventure Sheets ............................................................................................................ 66
Table of Contents

Quest 4: My Spot ................................................................................................................................. 69
  PreQuest Prep ............................................................................................................................... 70
  Resources ......................................................................................................................................... 71
  A Note to Nature Explorers ............................................................................................................. 72
  Adventures ......................................................................................................................................... 76
  Meet a Naturalist ............................................................................................................................. 81
  Adventure Sheets ........................................................................................................................... 84

Quest 5: The Wonder of Life .......................................................................................................... 86
  PreQuest Prep ............................................................................................................................... 87
  Resources ......................................................................................................................................... 88
  A Note to Nature Explorers ............................................................................................................. 89
  Adventures ......................................................................................................................................... 95
  Nature Art ......................................................................................................................................... 102
  Adventure Sheets ........................................................................................................................... 104

Quest 6: The Power of Plants ....................................................................................................... 106
  PreQuest Prep ............................................................................................................................... 107
  Resources ......................................................................................................................................... 108
  A Note to Nature Explorers ............................................................................................................. 109
  Adventures ......................................................................................................................................... 118
  Get Involved ..................................................................................................................................... 130
  Adventure Sheets ........................................................................................................................... 133

Quest 7: The World of Animals ..................................................................................................... 135
  PreQuest Prep ............................................................................................................................... 136
  Resources ......................................................................................................................................... 137
  A Note to Nature Explorers ............................................................................................................. 138
  Adventures ......................................................................................................................................... 148
# Table of Contents

Nature Art .................................................................................................................................................. 158
Adventure Sheets ....................................................................................................................................... 159

**Quest 8: Habitats Homes** ..................................................................................................................... 166

PreQuest Prep ........................................................................................................................................... 167
Resources .................................................................................................................................................. 168
A Note to Nature Explorers ..................................................................................................................... 169

Adventures ................................................................................................................................................ 176
Get Involved ............................................................................................................................................. 184
Adventure Sheets .................................................................................................................................... 187
Welcome to
Be a Naturalist!

What you hold in your hands is more than just another science curriculum or nature study program - it’s an adventure! More specifically, it’s an adventure designed to help your child discover science through nature exploration. In doing so, your child will learn to think like a scientist and connect with the natural world... one quest at a time. So grab your nature pack and get ready for YOUR adventure to begin!

Be a Naturalist is built upon the belief that elementary science should focus on topics a child can see, feel, and experience for himself, thereby allowing him to investigate his world. Concepts are not presented as facts to simply study or memorize, but as a part of life - as something real and meaningful to the child. What’s more, Be a Naturalist...

- is an all-in-one science and nature study program that will take approximately one school year to complete. The only other required resources are nature guides, which can be obtained from your local library.
- presents new topics in a living story format consisting of letters written by a naturalist and wildlife biologist working at a fictional nature preserve.
- is geared toward children in grades 2-5, although it can easily be tweaked for younger and older students.
- is suitable to any homeschooling method, including classical, traditional, Charlotte Mason, etc.
- combines indoor and outdoor adventures designed to keep your child engaged no matter the weather or your schedule.
- helps your child develop a knowledge of, and relationship with, the plants, animals, and other wildlife around him.
- contains outdoor adventures that can be conducted in any natural area near you - a local park, nature preserve, or your own backyard.
- includes extensive lists of optional supplemental resources so you can expand your child’s learning to suit his needs and interests.
Be a Naturalist strives to introduce your child to the fundamentals of nature study while building a solid understanding of foundational scientific concepts. The program is divided into eight units called quests, with each quest revolving around a specific topic. The quests are divided into four main parts:

1. **The PreQuest Prep** is written to the parent and provides an overview of what will be covered in the quest itself. Here you will find a summary of what your child will learn, an outline of the adventures and extensions, a list of needed supplies, a small box of advice, and a list of optional supplemental resources.

2. **The Note to Nature Explorers** is where new ideas will be presented. Each note is written to the child either by Kate, a naturalist, or Nate, a wildlife biologist. Kate and Nate are fictional characters who run a preserve called Hawk Valley Nature Preserve. While writing about their adventures at the preserve, Kate and Nate gently introduce important concepts about science and nature.
   - The notes include all the information needed to teach your child, although we highly recommend utilizing the suggested supplemental resources to enhance your child’s learning.
   - Colorful, engaging photos are spread throughout the notes. The photos expand upon the note’s topics and introduce your child to new plants and animals.
   - The Notes to Nature Explorers are meant to be read and enjoyed by parents and children together, although older children can easily read them on their own.
   - Key topics and new vocabulary are highlighted in bold throughout the notes so you can easily see what your child should be learning.
   - Because the Notes to Nature Explorers are living stories that contain all necessary information, they are best read over a couple days. Suggested stopping points are included for your convenience.
   - A discussion section with questions and short activities is included alongside the notes. We recommend going through these with your child after reading.

3. **The Adventures** consists of exciting, hands-on activities that explore the concepts introduced in the Note to Nature Explorers.
   - The adventures are written to the child, but are meant to be enjoyed by the parent and child together.
   - Since the purpose of the program is to connect children with their world, the majority of adventures take place outdoors in natural areas. These natural areas can be local parks, national forests, wildlife
preserves, your own backyard, or other available green space near you. The adventures are designed so you and your child can explore nature no matter where you live.

- Some adventures can be done indoors. These are perfect for days when going outside is not an option.
- We have made it a point to include many different types of activities to satisfy all children's natural inclinations. The child who loves getting her hands dirty, the child who loves creating works of art, and the child who loves experimenting will all find activities to suit her interests.
- The adventures are designed to be flexible, so that, no matter your child's ability level, he can participate. Likewise, they are easily tweaked for a family of varying ages.

4. **The Extensions** are designed to expand upon the theme or topic of the quest. Extensions consist of one of the following:

- *Meet a Naturalist* introduces children to a well-known naturalist and his or her work. Often times this is paired with a corresponding activity. For example, in the extension on Henry David Thoreau, children are given the opportunity to conduct a water depth experiment similar to the ones Thoreau did.

- *Nature Art* includes creative, nature inspired art or craft projects. Sometimes these projects might involve exploring popular nature art, such as Andy Goldsworthy's world famous land art. Other times they might be projects meant to help children use natural objects, such as a collage.

- *Get Involved* are extensions centered around helping wildlife in one way or another. For example, in the quest, The Power of Plants, children have the opportunity to create a way station for monarch butterflies.
Mission

Investigate the characteristics that make living things ALIVE
What is life? The entire field of biology is built upon the answer to that question. Before looking at the amazing abilities of plants or the incredible world of animals, it’s important to understand exactly what makes something alive. Hence, this quest will introduce your child to the characteristics that all living things, including himself, share.

Along the way, your junior biologist will:

- Learn that all things on Earth can be grouped as either living or nonliving
- Get to know the four main kingdoms of life
- Discover the five characteristics of living things by experiencing them through the eyes of Fluff, a great horned owl who lives at Hawk Valley
- Explore how he, as a person, meets the characteristics of a living thing
- Investigate the differences between living and non-living things
- Dive into the world of owls with various hands-on activities
- Create wild land art like Andy Goldsworthy

"In nature, nothing is perfect and everything is perfect. Trees can be contorted, bent in weird ways, and they’re still beautiful.”
- Alice Walker

A Nature Tip - It’s no secret... sometimes Mother Nature can be gross. Rotting animal carcasses, piles of fur filled scat, and blood sucking ticks aren’t exactly beautiful. But these things can also be pretty cool if you look past the ick factor. As a matter of fact, most children are more amazed than disgusted by what adults deem off-putting. In many cases, the idea that something is gross is learned from watching the reaction of grown-ups. If you recoil at the thought of holding a slimy frog or adding a snake skin to your nature collection, you might inadvertently pass on the same unnecessary repulsions to your child. Try to relax and look at these things through his eyes. Put on a brave face, be as enthusiastic as possible and, if you must groan, do so on the inside!

Supplies
- Copy of pages 104 and 105
- Nature pack with supplies
- Current and birth weight, height, photos (5.1)
- Natural, recycled, and/or craft materials (5.4)
- Art supplies (5.5)
- Optional supplies for owl activities (5.6)
Dear Nature Explorers,

Today is a mixed emotion day at Hawk Valley Nature Preserve. This afternoon Nate and I are heading out into the forest to release Fluff, one of our favorite animal friends, back into the wild. Fluff is a great horned owl that has been living at the nature center since we rescued her about a year ago. I’m happy she will be back in the wild where she belongs, but I’m sad to say goodbye.

The day we found Fluff, Nate and I were discussing what to do with a large oak tree that had fallen over a trail in Hickory Forest. As we walked around the tree, I heard a soft rustling sound coming from inside. At first I thought it was a mouse, but then noticed a fairly big hole near the top with feathers and leaves poking out. I carefully peeped into the hole, and that’s when I saw Fluff for the first time. She was huddled in the back of the hole, scared, dirty, and all alone.

I knew right away I had found a great horned owlet (baby). Great horned owls usually don’t build their own nests, but instead take over nests made by other animals, like hawks or squirrels. Great horned owlets, like the little one I had just found, are covered in white, fluffy feathers with just a bit of brown on their wings. They’re called great horned owls because the adults have large tufts of feathers that stick straight up off their heads like horns.

Nate and I carefully lifted Fluff out of her nest and immediately took her back to the Sassafras Nature Center. She was hurt when the tree fell and needed veterinary care. It turned out she had a broken wing, but the veterinarian patched her up. Kate and I then spent the next year taking care of our new friend and teaching her how to survive on her own. She became one of the favorite attractions at the nature center and we often used her to teach visitors about owls.
Now that Fluff is fully grown, she is a dark brown color with tufts. Since she is completely healed and has learned to take care of herself, she’s ready to return to her home in the forest. Hopefully she will be able to find a nice hole for herself in an old tree. As a nocturnal animal, Fluff will be awake at night hunting for mice and other small animals to eat. During the day, she will rest.

One of my favorite parts of working at the preserve is helping living things like Fluff. And Nate and I have definitely helped many. We’ve planted flowers, rescued numerous injured animals, built bluebird houses, fed rocks, installed beehives...wait! Did you catch my joke in that list? Take another look and see if you can spot it.

If you said feeding rocks, you’re right. Rocks aren’t living things like Fluff, flowers, bluebirds, and bees. And they certainly don’t eat or grow. Instead, they are called \textit{nonliving}. Every single thing on earth - a grain of sand on a beach, a sloth hanging in the rainforest, a water droplet in a cloud, a polar bear hunting on ice, a tree in your backyard - can be grouped as either living or nonliving. We’ll talk about nonliving things in a bit, but I want to tell you a little about living things first.

There are so many living things on earth that scientists separate them into different groups called kingdoms. These aren’t kingdoms with castles and knights, though. Instead, a science \textit{kingdom} is a large group of living things that are alike. Here at Hawk Valley, I mainly deal with the two largest kingdoms - plants and animals.

All plants, from tiny flowers to tall trees, are grouped together in the \textit{plant kingdom} because, even if they look different, they still have many things in common. The most important feature they share is the ability to make their own food. Animals on the other hand, can’t make their own food. Because they have this and many other features in common, they are grouped in a separate kingdom - the \textit{animal kingdom}. An ant and an elephant might look different, but they are actually very similar!

A smaller kingdom that I sometimes work with is fungi. \textit{Fungi} include the mushrooms you find growing around rotting logs and the icky green stuff you find growing on old bread. Some people think fungi are plants, but they’re not. That’s because fungi can’t make their own food.

(SAMPLE: Letter continues in \textit{Be a Naturalist})
5.2 A Living Treasure Hunt

Now that you’ve analyzed how you’re a living thing, it’s time to head outside to discover how many other living things you can find. But that’s not all. You’ll also be keeping a lookout for non-living things and man-made objects. Which do you think you’ll find more of?

For your treasure hunt, you’ll need to choose a designated area to focus on. Make it big enough so you have plenty of things to find, but not so big that the amount is overwhelming. If you want, you could even head back to your new special spot and search the area nearby.

Before you head out, prepare a page in your adventure journal by making two columns - one for living things and one for non-living things. You can also include a small area to record man-made objects.

As you walk through your area, look up, down, and all around for living and non-living things. The key is to find a variety for each category. Look closely for hiding animals, like tiny critters under rocks, and easily missed plants and fungi, like moss blanketing a shady spot or mushrooms growing on a log. As you find them, list your discoveries in the appropriate categories. Also jot down any man-made items you see.

Don’t forget that objects that once belonged to a living thing - such as branches, leaves, shells, and feathers - should be listed in the “living things” category because they once belonged to a living thing.

Non-living things can be difficult for children to recognize. Keep the following list in the back of your mind and gently help your child if she has trouble spotting non-living objects:
- rocks, dirt, water, sun, sand, air, clouds

Ask leading questions, such as “What shines and provides light for Earth?” or “What do we need to breathe in order to survive?” to help your child discover non-living things for himself.

You don’t need to identify every single living thing you find during your treasure hunt, but challenge yourself to identify at least one.
- Plant
- Animal
- Fungi
- Item from a living thing

Then draw each of your new friends in your adventure journal.
5.3 Are You Alive?

Investigate how one of your new nature friends meets the five characteristics of a living thing.

What awesome living things did you find on your Living Treasure Hunt? Did anything special catch your eye? Maybe you discovered a cool insect, oddly shaped tree, or strange mushroom.

Using page 105, you’re going to practice being a junior biologist by taking an even closer look at one living thing and how it meets the five characteristics of living things. You don’t need to have your find in front of you now, as long as you remember what it was and what it looked like. If you have trouble with any of the questions, do what Nate would do - research! You should be able to find the answer to all your questions using your nature guides or the Internet.

(Psst...If you want to use something that came from a living thing, use the plant or animal it came from to fill out your sheet. For example, if you found an empty turtle shell, try to identify what type of turtle it came from and then take a closer look how that turtle is a living thing.)

As a plant, this wildflower (called a teasel) makes its own food. The bee is looking for flower nectar.

Since this antler once belonged to a deer, it is considered a living thing.

This Canada goose reproduced with its mate to lay eggs. The eggs hatched into three adorable goslings.

We know it’s tempting to simply tell your child the answers to the questions they don’t know, but try to resist! Instead, help her find the answers so she not only gains important research skills, but also feels a sense of accomplishment at discovering something new on her own.
5.7 Land Art

When you hear the word art, what do you imagine? Famous paintings in a museum? Ancient sculptures on pedestals? Crayon drawings hanging on the refrigerator? While those are all excellent examples of art, there is another type...one that involves nature, imagination, and the march of time. People call this land art.

When you create land art, the world is your canvas. You don’t work in a studio bent over a desk, but right out in the wild, using materials from nature to create colorful, intense masterpieces. These masterpieces never make it beyond the forest, fields, and creeks where you construct them. Instead, they slowly succumb to the passage of time until they’re gone forever.

People who create land art often take photos to remember and share their creations with others. Sometimes they even return to photograph the gradual destruction as their masterpieces are reclaimed by nature.

You’ll have the chance to make your own land art in this activity. This art will be imagined by you, planned by you, and created by you using natural materials chosen by you. Your art studio will be the wild outdoors and your creation will be left in the wild, where it will slowly disappear with time.

Any natural area will work for this project as long as you use your imagination. Once you pick out a spot, start searching for rocks, leaves, mud, sticks, clay, bark, pebbles, flowers, and other items to use. If you get stuck planning what you want to create, play around with your materials - an idea might naturally come to you. If you need inspiration, check out the ideas on the next page.

Once your art creation (or creations if you’re ambitious!) is complete, take a picture and head on your way. It might be hard to leave your art in the middle of nowhere, but remember - there’s something mysterious about designing a masterpiece and leaving it in the wild. What will become of it? How long will it last before it succumbs to rain or wind? What will other explorers think when they suddenly happen upon your creation? If you want, you can always return another day to see if your creation is still standing. Or, you could return multiple times to photograph its gradual disappearance. You might be surprised how long it lasts!

There are many well known land artists you can read about online, but one of the most famous is Andy Goldsworthy. This British artist incorporates amazing geometrical designs into his captivating masterpieces. We highly recommend browsing photos of his and other land artists’ work before setting out with your child to create your own. You might even be able to find books about some land artists at your local library. Leave them out where your child can peruse the gorgeous photos.
6.4 Plot Study

Practice being a junior botanist as you discover how many plants are living in a single area.

Before you get into the details of a plot study, you need to learn about a special word scientists use. It’s the word species. **Species** is basically another word for “kind.” Let’s say you walked through a park and saw five trees - two sugar maple trees, two northern oak trees, and one shagbark hickory tree. Even though there are five trees, there are only three different kinds - in other words, three species.

Believe it or not, there are over 300,000 species of plants on Earth, and scientists are still discovering more! Remember, that doesn’t mean there are 300,000 plants growing on Earth...that number is so huge it’s impossible to count. Instead, it means there are over 300,000 different kinds of plants.

Often times, botanists need to determine how many species of plants live in a certain area. Because it would be extremely difficult to count every type of plant in an entire forest, field, or other natural area, they conduct a plot study. In a **plot study**, a scientist marks off a small square within the larger area and counts the number of plant species within it. That number is then used as an estimate for the entire area. Instead of estimating the number of species in a large area, you’re going to focus on counting the number in one square. Turn the page to find out how!

What do the three plants on the left have common? Most people would call them weeds. But what exactly is a weed? Believe it or not, weeds are just everyday plants, many with their own beautiful flowers.

What makes certain plants weeds are how people think of them. The most common ones, like dandelions, are those that bother us, usually because they are tough plants that grow easily and quickly. They end up in sidewalk cracks, lawns, and vegetable gardens. And while some of these plants can cause problems because they don’t belong here (they have been brought from other countries), many are just normal plants trying to survive. Of course, that doesn’t mean people want them growing everywhere!
6.4 Plot Study (continued)

1) Choose where you want to do your study. Try to pick a place filled with a variety of plants.

2) Prepare a page in your adventure journal to record your findings. Include a title (“Plot Study”) and the location and date of your survey.

3) Mark off your plot by making a rough square 25 feet by 25 feet. You can use string tied to trees, sticks pushed into the ground, or stacked rocks to mark your corners.

4) The information a scientist collects is called **data**. Your data is going to be the number of plant species growing in your plot. To collect your data, you will need to explore your plot closely. Each time you find a different kind of plant, put a checkmark in your adventure journal.

5) Analyze your data by counting how many checkmarks you have. That number is how many species of plants are growing in your plot.

Don’t worry about identifying plants in this adventure unless your child asks to. The main focus should be on helping her discover the wide diversity of plant life.

My Plot Study

Rocks make perfect corner markers if your plot is near a creek.

If you want to challenge yourself, choose one species of plant and see how many individuals you can find.

Preston discovered stinging nettles during his plot study. These pesky plants have hollow needles that release a stinging substance into skin when touched.

Do you have them in your area?
Meet a Naturalist

Henry David Thoreau

In this quest, you’ve focused on finding and exploring your very own spot in nature. Now imagine living in your spot for two whole years! Your home would be a small hut you built yourself, you would rarely see any other people, and you would survive by gathering food, firewood, and other necessities from the wilderness around you. What do you think that experience would be like?

Believe it or not, a naturalist in the 1800’s did just that! His name was Henry David Thoreau (photo, right). Henry, who lived his whole life in Massachusetts, was a bit different from most people of his time. Not only was he outspoken about his political opinions, like the evils of slavery, but he also had some uncommon ideas about life. While most people were working six days a week trying to make money and buy more material goods - bigger houses, fancy clothes, nice toys - Henry was wishing they would slow down. He believed people would be happier if they lived simpler lives and concentrated more on enjoying the beauty of the world instead of toiling for needless stuff. He even said, “Wealth is the ability to fully enjoy life.”

Eventually, Henry decided he wanted to take a break from the busy world that he felt he didn’t fit in with. He wanted a quiet place where he could immerse himself in nature and finish a book he was writing. His friend, a famous poet named Ralph Waldo Emerson, told Henry he could borrow a piece of land he owned on the shore of a beautiful lake called Walden Pond. This piece of nature became Henry’s “spot” for the next two years. He said, “I went to the woods because I wanted to live deliberately, to front only the essential facts of life. And see if I could not learn what it had to teach and not, when I came to die, discover that I had not lived.”

During those two years, Henry lived in a small shack (photo of replica, left) he built himself and survived mostly on what he could gather from nature. He tried to work only one day a week and spent the other six days writing, studying wildlife, and pondering life. The forests surrounding Walden Pond were teeming with life, and Henry soaked in the beauty of it all - from the towering trees to the tiniest insects.

SAMPLE: Continued in main program.