



Wildlife & Water **HABITATS**

4-H VOLUNTEER GUIDE



WILDLIFE & WATER HABITATS

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INTRODUCTION

Welcome to the *Wildlife and Water Habitats Volunteer Guide*, the supplement to a curriculum that teaches middle school-age children about multifarious habitats. This guide offers many ideas to help you as a 4-H volunteer, teacher, or parent, including suggestions for group lessons, extra information on techniques, and broader context for the activities.

Because it is intended as a companion to the *4-H Youth Curriculum*, you should read the latter as well. In it, its authors, Marcie Galbreath-Rawls and Jim Ekins, integrate a storyline with activity-based, hands-on, and place-based assignments about wildlife and water habitats in any U.S. state or territory that should appeal to young teens. Furthermore, its methodology is tried-and-true. Based on other wildlife activity-based programs that both authors have used extensively, including Master Water Stewards, section 2 (water resources and habitat), its organization flows in bite-sized lessons, a pace age-appropriate for a youth audience.

Additional influences for both publications include the Micron STEM Education Research Initiative's (University of Idaho Extension) (<https://www.uidaho.edu/academics/stem/signature-area/micron/reports>) findings, on which the authors used to base the overall structure of the curriculum and volunteer guide; and the organizational structure in Water Quality Matters! 4-H Water Project—Unit 3 (Pennsylvania State University, College of Agricultural Sciences) (<https://extension.psu.edu/programs/4-h/opportunities/projects/environmental-science/aquatic-environments-and-water>), which the authors used to adapt the overall flow.

Educators can tailor the pacing, scope, and sequence to their needs, though the authors intend the *Youth Curriculum* as a three-year-long program to be implemented by 4-H Natural Resources or 4-H Science clubs. In addition, the authors intend the *Youth Curriculum* to be used in formal and nonformal (e.g., out-of-school programs) curricular settings.

The first section focuses on wildlife habitat and learning about complex systems. Youth learn to look at different types of habitats and the variety of animals that might inhabit them; to research the availability and quality of nearby food sources and shelter; to describe a habitat in specific terms; and to make a model of a habitat. The second section focuses on water habitat and learning about watershed processes. Investigative activities include habitat assessments, physical/chemical water-quality assessments, and biological stream and pond assessments. Youth will learn about streams and lakes from a whole-watershed perspective: watershed functions, water quantity and wise water use, water-quality criteria measurement, and stream and pond structure.

Lesson Structure

Each lesson follows a standard structure. The lessons start with a story about two fictional characters, Emily and Logan. Their story develops throughout the entire program (both *Wildlife and Water Habitats*) to introduce each successive lesson and its essential questions, to keep youth reader interest, and to weave together the concepts. For each lesson, five parts follow every narrative opening:

- Learning Objectives
- Materials
- Procedure (condensed instructions of exactly how to proceed)
- Let's Do It! (a description of the activity's steps—what to actually do, related to the Procedure section)
- Reflection (adheres to a “Do-Reflect-Apply” framework, an experiential learning approach)

Experiential Learning

What is experiential learning? It is, in its simplest form, learning from experience. True experiential learning also includes reflection, which can happen in a variety of ways (e.g., individual reflective journaling, small or large group discussion).

There are several ways to approach experiential learning. With this curriculum, we use *Do, Reflect, Apply*. This is a simple, yet effective way for youth to become totally immersed in an activity. It stimulates metacognition (thinking about thinking), which takes learning beyond the surface level to a deeper understanding of concepts.

DO — The experience. This is the *Let's Do It!* Section. You can “Do” something big or small individually or in a group. The idea here is to begin the experience and, thus, begin the learning.

REFLECT — The contemplative sharing. This is part 1 of a “Reflection” section. Youth talk about their learning experience. This can be done individually or as a group, via oral and/or written language. This is a free-thought process: sharing any and all experiences. As the volunteer leader, you can ask open-ended questions to begin. For example:

What activity did you do?

What did you learn?

Where did you do the activity?

How did you feel during . . . ?

What was easiest, and why?

What was most difficult, and why?

What would you change the next time you did that or a similar activity?

Then, facilitate youth’s ability to process the learning (or to continue a “Reflect”) by using the information presented in the reflection prompts; by asking youth to relate the learning experience to previous ones; or by providing them with opportunities to apply the knowledge (see below).

APPLY — The real-world application. This is part 2 of a “Reflection” section. This is where youth generalize their learning, then apply it to their everyday lives. Here, youth (with the help of volunteer leaders and parents) find points where the activity applies to the real world. Youth can also reflect on academic and life skills they learned during the activity, which may benefit them in the future.

During this part, encourage youth to reflect on their own agency. How will they act differently (in the future) after completing this activity?

A Word about Outdoor Classrooms

Wildlife and Water Habitats is a STEM curriculum with the majority of the sections intended for in-the-field participation. Therefore, we need to discuss outdoor classrooms and safety considerations.

Wildlife

Teachers, parents, and 4-H leaders are encouraged to use the natural places within and surrounding their communities as outdoor classrooms (see Figure 1). Being immersed in nature is the best way to learn many of the STEM skills and content in



Figure 1. Outdoor classroom example. Photo Credit: Marcie Galbreath-Rawls.

this curriculum. Research shows that spending time in nature improves youth's engagement and academic performance, while it also decreases the incidence of behavioral disorders and acting out. It is best that youth conduct field portions of this curriculum in geographical areas with which they are familiar, or that they have explored virtually (e.g., using Google Earth), so that they can more comfortably and safely comprehend or build a basic understanding of topography and its potential dangers (caves, waterways, wildlife; etc.) and to remove the novelty of being in a new environment. Consult professionals from agencies such as the federal or state Fish and Wildlife Service, Master Gardener Program, state or federal land management agencies, and others who can educate youth, teachers, and volunteers on potential flora and fauna dangers in the natural spaces you and your participants choose to study. With this kind of proper preparation, nature becomes an excellent and safer classroom.

Water

We encourage teachers and 4-H leaders to take their youth and youth clubs to a stream or pond to explore its structure and habitats, physical and chemical attributes, and, of course, aquatic macroinvertebrates. Waterways are the best place to learn about watersheds, especially the habits and adaptations of the organisms that populate them.

Youth will benefit from the opportunity to investigate freely. Research shows that classroom experiences in conjunction with field experiences enhance youth learning. However, it is best to conduct a field experience after youth have gained some knowledge of what an aquatic macroinvertebrate is and what adaptations to their environment they've developed. Teachers or leaders should also plan at least one final lesson after the field experience to reinforce and to revisit what youth experienced in the field. We offer some basic safety tips below, but please be aware that streams have higher flows during the spring season, which may make them unsafe outdoor classroom settings, especially for young children. In these cases, plan on having youth conduct their collecting activities during the late summer or fall.

Safety Tips for Macroinvertebrate Sampling

Kids and water are a natural combination. To ensure the two mix well, consider the following guidelines before going to the stream site:

- If possible, allot one adult supervisor per six youth participants.
- If you choose to split up into groups, maintain a reliable line of communication among groups at all times (e.g., stay within hearing distance).
- Be aware of medical considerations; make sure you have ready access to first aid supplies.
- Know which youth are allergic to bee stings and how to handle a reaction. Know the causes and early warning signs of hypothermia and heat exhaustion.

When choosing a stream site, be aware of these safety precautions:

- Avoid steep, slippery banks.
- Be mindful of any holes, vertical banks, and other hazards. These can be especially difficult to see when the banks are heavily vegetated.
- Scout the area for dangerous trash such as broken glass, rusted wire, or metal scraps.
- Scout the area for poison ivy, poison oak, and stinging nettle.
- Note any moving water flows. They can be deceptively dangerous. Don't let youth enter water that is moving very fast!

- Know where the water depth increases suddenly or significantly. Don't let youth enter water that covers their knees!
- Keep updated on the weather forecast in your chosen area. Never visit a stream during a lightning storm and beware of sudden storms that could produce flash floods.

Many of the above safety tips apply to the Wildlife Habitat activities as well. Additionally, please consider the following:

- Always carry plenty of water when working in the field.
- Protect yourself from the elements. Use sunscreen and wear proper clothing and footwear.
- Carry a first aid kit.
- Carry a cell phone and/or walkie-talkie.
- Work in pairs or groups. Never conduct field work alone.

Presentation and Portfolio Requirements

The *Youth Curriculum* allows for a presentation component at the end of each year (section 2, chapter 7). Please follow the requirements described therein.

In addition to the presentation, we expect youth to develop one of the following record types as part of their field investigations:

- Design Portfolio
- Engineering Notebook
- Field Journal

The exact “look” or content style of their portfolio, notebook, or journal, is less important than the completeness to which each youth participant faithfully documents her/his learning experiences as s/he progresses through the program. These are commonly used project documentation types (see Figure 2). Advise participants to do what feels right

Research Tool Option 1: Design Portfolio

A person with a more **artistic bent** might develop a design portfolio, heavy on labeled drawings, sketches with written descriptions, and other images with some context. There are many ways to create a design portfolio, including using a 3-ring binder, plain paper (no lines) drawing journal, or hardcover composition notebook. Whatever you choose, it will need to have enough pages to complete this three-year curriculum. Make sure you create a label for your portfolio—include your name, 4-H club or other affiliation, title: *Wildlife and Water Habitats Curriculum Design Portfolio*, and any other identifying information.

Research Tool Option 2: Engineering Notebook

A person with a more **mathematical mind** might develop an engineering notebook with formulas, graphs, tables, and scale drawings, again with notations and context included. Like the portfolio, there are many ways to create an engineering notebook. You can use a hardcover or softcover graph paper notebook, 3-ring binder, plain (drawing) or lined (writing) journal, or hardcover composition notebook. Whatever you choose, it will need to have enough pages to complete this three-year curriculum. Make sure you create a label for your notebook that includes your name, 4-H club or other affiliation, title: *Wildlife and Water Habitats Curriculum Engineering Notebook*, and any other identifying information.

Research Tool Option 3: Field Journal

A person who **likes to write narrative descriptions** might develop a field journal with written reflections about her/his experiences, but also include sketches, drawings, and mathematical formulas. There are many ways to create a field journal, including using a plain (no lines) drawing journal, hardcover or softcover graph paper notebook, 3-ring binder, or journal you create from scratch (described at the beginning of this *Procedure* section) using cardstock (or other equally thick paper) for the cover and plain paper for the inside. Whatever you choose, it will need to have enough pages to complete this three-year curriculum. Make sure you create a label for your journal that includes your name, 4-H club or other affiliation, title: *Wildlife and Water Habitats Curriculum Field Journal*, and any other identifying information.